CW SAMPLE COPY
MI48106UIVMUIVYM FCMB
UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR 48106

NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

...ly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1980 by CW Communications, Inc.

...o. 30 July 28, 1980 $1.00 a copy; $30/year

Wide World Photos

'We Won't Go'

While demonstrators staged a 'sit-in' on the steps of the Boston Post Office to protest registration for the draft, an army of Internal Revenue Service keypunchers were standing by, ready to process registration forms. Story on Page 9.

IBM H Series in Sight; Reason for Delay Blurry

By Tom Henkel
CW Staff

Most analysts agree on what IBM's H series will look like, but just why IBM has not announced it sparks some controversy.

The H series is now being seen as a seven-model line, built on two basic CPUs or "engines." The line will probably be the first fully field-upgradable series IBM has ever offered, allowing a low-end H-1 user with a 3 million-instructions-per-second (Mips) machine to migrate all the way to the largest, H-7, a 20-plus Mips machine. The biggest system IBM currently offers is the 3033 multiprocessor at 7 to 8 Mips.

H series systems will probably cost between $1.25 million and $8.4 million, roughly $300,000 to $400,000 per Mips, according to IBM watchers from at least three consulting firms. These consultants also predicted the first system, a 10-Mips mid-range model, would be announced sometime in the first quarter of 1981.

Backplane Defects?

Why IBM has delayed announcement of the series, originally scheduled for last September, is another story. Some analysts, like Gartner Group's Dave Stein, spoke of tiny bubbles in a new kind of fiberglass backplane that allegedly tear metal connectors off silicon chips — causing short circuits throughout the system.

Other analysts, like those at Strategic Business Services, Inc., said IBM's new computer series works fine and interpret the firm's release date as part of its goal of milking every penny it can from users of the 30 series.

Although one IBM analyst noted that a single rumor can go a long way in the IBM-watching business, most IBM watchers agreed on the IBM terminology, code names, configurations, Mips ratings and projected release dates of the entire H series.

The first announcement is expected

(Continued on Page 7)

Batch Processing Disrupted

Pay Strike Catches L.A. Off Guard

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — Many of this city's most important administrative functions ground to an abrupt standstill earlier this month when 200 municipal computing personnel staged a three-day walkout to demand increased pay.

The strike that took place recently caught city officials off guard and almost immediately brought all the community government's batch mode applications to a screeching halt.

Although the temporary loss of batch processing capability resulted in no major disruptions of basic city services, it did prove an irritating inconvenience for a slew of municipal government agencies, including the library, legal, engineering and accounting departments.

Otherwise, however, city services appeared to emerge from the unexpected work stoppage relatively unscathed.

The main burden for keeping the city's on-line systems up and running fell to a skeleton crew of information systems supervisors and, to a large extent, their efforts as substitute programmers and operators apparently

(Continued on Page 6)

Structured Methods Found No Cure-All

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Bob Doolittle knows from personal experience that software engineering and structured methodology can dramatically improve a computing center's operations. But he also knows from personal experience that the improvements seldom come easily.

Doolittle works as information systems manager for a computing installation that, in effect, operates as a service bureau for San Diego County's Department of Education. Built around a 1.5M-byte Burroughs Corp. B6700, the service bureau performs applications like payroll, financial accounting, grade reporting, student recordkeeping and class scheduling.

The service bureau's first brush with software engineering and structured methodology came about two-and-half years ago when Doolittle and his colleagues were still searching desperately for a way to lift their installation out of its perpetual doldrums.

At the time, the symptoms of the service bureau's ailments were legion. Its backlog of unfinished programming work had swollen to unmanageable proportions, Doolittle recalled.

Practically all the service bureau's many ills stemmed from a single cause: excessive software maintenance requirement. Because Doolittle and his colleagues inherited much of their software from outside sources and because some of that software was inferior in quality, the computing center's programming staff typically had to spend a whopping 80% of its work time just maintaining existing pro-

(Continued on Page 8)

Programmers Seen Needing Fewer Skills

By Brad Schultz
CW Staff

BOSTON — The superskilled programmer — that shining knight of computing's heroic age — may never die in some MIS shops, but he's bound to fade away elsewhere because technological progress and economic factors are "de-skilling" software specialties.

Software managers who regularly fret over where to find their next IMS/VS Cobol jockey with Vtam experience might dispute this view of sociologist Philip Kraft. Through three decades and into the stagflated 1980s, programmers have enjoyed rapid salary growth and many have had no qualms about jumping from employer to employer for better pay, greater

(Continued on Page 6)

32-Bit Mini Vendors 'Spreading the Word'

Product Spotlight

By Tim Scannell
CW Staff

Like Bible-toting preachers moving from town to town down South, a lot of minicomputer vendors are busy spreading the word. The word length, that is, from 16 to 32 bits.

Compared to minicomputers with the traditional 16-bit word size, 32-bit machines basically offer a higher transaction throughput and have a faster response time when there are a large number of terminals hooked up to the main processor. They are also able to support larger data base capacities, according to Jim Perry, a marketing manager with Data General Corp.

"In a disk-intensive environment, which most commercial applications are, where there's a lot of disk activity, the 32-bit systems not only handle a larger number of files, but in general are much more efficient at handling the I/O and disk activity and give a better throughput," Perry said.

Also, "if you have an independent I/O channel with a large bandwidth, that could cut down on a significant amount of overhead that is normally associated with a business environment," he added.

DG, a relative newcomer to the 32-bit race, entered a field earlier this year

(Continued on Page 10)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM reg. U.S. Pat. Off.

Editor E. Drake Lundell Jr.

Managing Editor Nancy French

News Editor Cheryl Gelb

Senior Editors:
Industry Marcia Blumenthal
Software Marcy Rosenberg
Communications Brad Schultz
Systems Rita Shoor
Features John C. Whitmarsh

Senior Writer:
Communications Phil Hirsch

Correspondents:
West Coast Jeffry Beeler
Washington, D.C. Jake Kirchner

Writer/Analyst Marguerite Zientara

Staff Writers Tom Henkel
Bruce Hoard
Timothy J. Scannell
Connie Winkler

Chief Copy Editor Catherine Marenghi
Copy Editors Nancy Fleming
Steve Milmore
Barbara T. VanScoyoc

Photography Editor Ann Dooley

Editorial Assistant Martha Taylor

Editorial Cartoonist Jim Orton

Contributors:
Education J. Daniel Couger
Taylor Reports Alan Taylor
Human Connection Jack Stone

For Sales, Circulation and Production contacts, see inside back page.

Please address all correspondence to the appropriate department at 375 Cochituate Road, Rte. 30, Framingham, Mass. 01701. Phone: (617) 879-0700. Telex: 95-1153

OTHER EDITORIAL OFFICES:

West Coast: 407 California Avenue, Suite 10, Palo Alto, California 94306. Phone: (415) 328-8064.

Washington, D.C.: 821 National Press Building, 529 14th Street N.W., Washington, D.C. 20045. Phone: (202) 347-6718.

England: Steve Burton, IDG Publishing Ltd., 146 Clerkenwell Road, London EC1 Phone: 01-837-1222. Telex: UK-269477.

W. Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40, Phone: (089) 34-90-61. Telex: 5215350.

Asia: Hidetsuna Sasaki, Dempa/Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex: J2424461.

Australia: Alan Power, Computerworld Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (02) 4395133, Telex: SECCO AA25468.

Brazil: Eric Hippeau, Data News, Computerworld do Brazil, Servicos e Publicacoes Ltda., Rua Alcindo Guanabara, 25/10th floor 20031 Rio de Janeiro, RJ Brazil. Phone: (021) 240-8225. Telex: 2130838(WORD BR).

Mexico: Kevin Kelleghan, Computerworld de Mexico, Oaxaca 21-2, Colonia Roma, Mexico City 7 D.F., Phone: (905) 514-4218, (905) 514-6309.

Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Published weekly (except: a single combined issue for the last week in December and the first week in January) by CW Communications/Inc. Copyright 1980 by CW Communications/Inc. All rights reserved. ISSN 127-420. Reproduction of material appearing in *Computerworld* is forbidden without written permission. Send all requests to Marion Kibbee.

$1.00 a copy: U.S.— $30 a year; Canada, Central & So. America — $50 a year; Europe and Near East — $90 a year; other foreign — $150 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

ABP MCC MEDIA DATA FORM

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 375 Cochituate Road, Framingham, MA 01701.

Including System/3 Conversion Aid

System/38, Series/1 Gain Software

ATLANTA — IBM announced five licensed programs for the System/38 last week, including a conversion aid for users of IBM System/3 Communications Control Program (CCP) applications.

The firm also brought out seven programs for Series/1 Event-Driven Executive (EDX) users, said to provide increased communications capability and support for interactive applications.

Consisting of a set of System/3 RPG-II programs and procedures to convert System/3 CCP applications to the System/38 environment, the conversion aid runs on System/3 models 8, 10 Disk, 12 and 15. It will let users do their conversion on a System/3 before a System/38 arrives at their site, IBM said.

Other System/38 offerings include four "customer service" programs — billing, accounts receivable, inventory control and sales analysis — added to IBM's line of applications software in the System 38 Distribution Management System (DMS/38).

Screen Capabilities

New Series/1 EDX software is said to utilize the full-screen capabilities of the IBM 3101 display terminal, which can be attached locally or remotely.

One package, the Series/1-System/370 Channel Attach licensed program, allows EDX users to communicate with another user-written application program in a host 370.

EDX data management enhancements also make it possible to access larger data bases, the firm added. For example, disk data sets now are limited only by the size of the disk attached to the Series/1, compared with the previous limit of 32K records.

Spool Support

A spool support facility automatically routes printer output from multiple programs to the same printer to facilitate execution of concurrent applications, according to IBM.

Another program, an enhanced EDX Multiple Terminal Manager, is said to provide an expanded base for transaction-oriented applications that are source-compatible with the existing EDX Multiple Terminal Manager.

Five of the new Series/1 licensed programs comprise Version 3 of the EDX operating system. They are Basic Supervisor and Emulator, Utilities, Program Preparation Facility, Macro Library and Macro Library/Host.

Scheduled for first deliveries in February 1981, the System/3 CCP to System/38 Conversion Aid Licenses for a one-time charge of $2,225. DMS/38 Customer Service Application programs will be available in December 1981, carrying monthly license charges as follows: billing, $75; accounts receivable, $65; inventory control, $70; and sales analysis, $60.

All EDX programs will be available in September. The Series/1-System/370 Channel Attach program licenses for $60/mo and the enhanced EDX Multiple Terminal Manager will be available for a $15 monthly license fee.

Monthly license charges for the other EDX programs are $29 for Basic Supervisor and Emulator, $24 for utilities, $28 for Program Preparation Facility, $53 for Macro Library, and $150 for Macro Library/Host.

These System/38 and Series/1 EDX software offerings are available from IBM's General Systems Division, P.O. Box C-1645, Atlanta, Ga. 30301.

IBM Offers MVS/SP Support On 4341 as No-Charge Option

WHITE PLAINS, N.Y. — IBM is formally supporting its MVS/SP operating system on the 4341.

Announced as a no-charge option, Extended Control Program Support on the 4341 includes the MVS Base Control Program and Job Entry Subsystems (JES2 and JES3), IBM said last week.

The announcement also applies to IBM's Resource Management Facility, a recently announced feature that provides support for IBM's new 3380 and 3375 disk drives, along with support for enhancements to JES2 and JES3 [CW, June 16].

In addition MVS' users can cash in on MVS extended addressing feature, which allows a CPU to address up to 32M bytes of information, IBM said.

MVS support has been much desired among those who use 4341 systems in a distributed environment with a 370 or 30 series host. While some users have brought MVS up to 4341 systems, official IBM support will open the door for more users to do the same, according to industry analysts.

In addition, the announcement will have a dramatic effect on residual values of IBM's 3031 processor, formerly the smallest CPU capable of running MVS. John Rhefield, vice-president of the West Coast office of International Data Corp. said a used 3031 could drop from a $965,000 purchase price to $350,000.

IBM's anticipated announcement of a 4341 Model Group 2, a more powerful processor than the existing 4341, will help to drop the residual value of the 3031, and the MVS announcement will start the residual downslide, Rhefield added.

This Week

IN DEPTH
Maintenance Programming 27

NEWS
White House Asks Communications Act Changes... 4
Users Applaud Amdahl for Upkeep, Technical Aid .. 5
I/O Standard Foes Granted Expedited Hearing..... 8
Selective Service Recruits IRS Keypunchers..... 9
Sampling of 32-Bit Mini Offerings Shown..... 10
Pennsylvania PUC Delays Bell EMS Forerunner ... 12
Gas Rationing Seen Fueling Long Lines at Banks .. 13
Vendor Graphics Show Turnout Mirrors Growth ... 14
Graphics User Warns of Inflated Expectations..... 15
Managers Told to Rethink Views on Graphics 16
Project Opens Computer Science to Women..... 17
Wats Service May Face Demise in September..... 18
Electronic Mail Slated as Topic of Symposium 19
Managers on the Move 20
Three Charged in $500,000 Coca-Cola Theft..... 21
UNH Enrolls DBMS to Perform Applications 22
New Gauges of Programmer Productivity Set 23
TI's DS990/2 Scores High in Benchmark Tests 24
Turnaround Time..... 25

EDITORIAL
Editorial: Computers and the Draft..... 32
Datapro's Computer User Survey: An Analysis 33
Arbitration Has Its Advantages..... 33
Taylor Report: PL/I Escaping Hardware Vendor ... 34
Human Connection: Systems Managers Speak.... 39

SOFTWARE & SERVICES
B&B Planning Tools to Ease Capacity Planning.... 41
'Power VS Queue Stripper,' 'Loader' Enhanced.... 42
ACM Offers Tapes on Languages..... 43
SAS Provides Econometric Aid 44
Programmers Offered Testing, Debugging Tool ... 46

COMMUNICATIONS
HP Terminal Screen Gives Four Windows 47
Net Geared to Test Environment..... 48
Terminals Compatible With IBM 3101, DG 6052 ... 49

SYSTEMS & PERIPHERALS
Approach Lets User Program Own Jobs 51
Distributed Processing Not for All..... 52

MINIWORLD
HP Customizes Service Agreements 53
TI Adds Data Acquisition Gear 54

COMPUTER INDUSTRY
High-Tech Stocks Luring Investors..... 55
Whitlow Sort Processes Patented..... 55
Ramo to Keynote Wescon/80 56
GSA Proposals Stress Software Conversions 57
Magnuson Revenues Rally 58
CSI Sees Steady Growth in Net Processor Sales... 59
October Symposium Set on DOD Electronics 60
Work/Study Programs Train Employees 61

SORTDANCE

Could anybody clean up the "toughest sorting town in the West?"

(Only the SyncSort Kid!)

Call (201) 568-9700.

Have DOS sort, will travel.

Special to Whitlow New Service

SORTDANCE, ARIZONA – For years this pioneer DOS/VS community was known as the "toughest sorting town West of the Pecos."

According to old timers, this reputation stemmed from the antics of the notorious "Hardware Gang," four renegade sort programs who drifted into town years ago. Still wearing their old convict numbers – 5746-SM1, 5746-SM2, 5743-SM1 and SM-483 – the four brothers made a practice of terrorizing sorts.

"They'd get tanked up on hard computer resources, then they'd go looking for dude sorts," said Gabby Hades, a retired uranium prospector. "When they found one they'd whip out their guns and tell the poor critter to start dancin. That's how the town got its name."

But things are different in Sortdance now. The other day, just before noon, a tall quiet stranger rode into town. He tied up his buckskin horse and ambled into Aunt Kitty's "Last Chance Saloon."

Aunt Kitty looked at the stranger and said, "I reckon you're the SyncSort Kid, stranger. I heard the Sort Reform Committee sent for you. But do you think you're fast enough to take on them four galoots?"

The kid smiled shyly. "Yes ma'am. I don't wanta brag, but I reckon I'm 20 to 40 per cent faster on Elapsed Time, and 15 to 30 per cent faster on CPU Time. I got 'em whupped on Disk Space Utilization and SIOs too."

When Aunt Kitty said the kid reminded her of somebody, he replied: "Probably my big brother, O. S. SyncSort. We got the same kind of features. Things like INCLUDE/OMIT, SUM and OUTREC. We both like to give programmers a break, specially if they're migratin."

Then Gabby rushed in the door and hollered: "They're out there waitin for ya, Kid! All four of the Hardware Boys. They say this town ain't big enough for five DOS sort programs!"

As the clock struck noon, the SyncSort Kid tipped his hat to Aunt Kitty, loosened his guns in their holsters and walked through the swinging doors. Moments later a fusillade of shots rang out.

Aunt Kitty rushed to the door. "I expected to see that nice young feller stretched out in the dust. But he was standin up straight as an oak, with his shootin irons still smokin. It was the Hardware Boys that was ready for a trip to Boot Hill!"

The town is now known as "the sorting capital of the Sunbelt." And at today's general election, the citizens voted to change its name from Sortdance to Fort SyncSort.

OVERSEAS REPRESENTATIVES—

Düsseldorf: SyncSort Technology GmbH, Tel.: 0211-480351
Johannesburg: Computing Benefits Ltd., (011) 46-5211
Melbourne: Shell Co. of Australia Ltd., (03) 8400311
Milan: SYNTAX, (39-2) 87. 74. 44
Paris: CAP/SOGETI Produits, 33-1-539-22-25
Reading (UK): SyncSort Technology Ltd., 44-0734-481919
Stockholm: BRA, 46 8 88 03 00
Tel Aviv: ADVANCED TECHNOLOGY Ltd., 442697
Tokyo: Software Engineering Co., Ltd., (03) 446 1811
Utrecht: SyncSort Technology BV, 030-31-26-11

WHITLOW

COMPUTER SYSTEMS Inc. 560 Sylvan Ave., Englewood Cliffs, N.J. 07632

White House Requests Changes in Rewrite Bills

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Chances of passing a new communications act this year dropped back to near-zero last week after the Carter Administration and a key Congressman called for changes in the legislation. That at least is one view of the situation.

Another is that Ma Bell is being pushed inexorably into a corner, a position that will force her to push for enactment of the pending legislation this year.

The Congressman involved is Rep. Peter Rodino Jr. (D-N.J.), chairman of the House Judiciary Committee. The Administration's position came from the Commerce Department.

Behind the Administration's move, and possibly the Congressman's, was an intensive lobbying effort by opponents of the legislation, with computer industry trade asociations in the forefront.

The Administration's proposed changes were contained in a letter written by Joseph M. Levine, acting general counsel of the Commerce Department, to Rep. Harley O. Staggers (D-W.Va.), chairman of the House Commerce Committee. One version of the "communications act rewrite" bill (H.R. 6121) is pending before Staggers' committee.

Levine and the Administration object to language now in H.R. 6121 which sharply limits the power of the Federal Communications Commission (FCC) to alter AT&T's corporate structure once the legislation is enacted.

"Telecommunications is a dynamic field, and requirements set down today may prove inadequate in the future," he pointed out, adding that the bill should allow the commission to "take further actions, or modify specific requirements, on the basis of experience or changed circumstances."

Underlying this request is an Administration hope of ending — or at least deferring — the controversy that has stymied efforts to pass a new communications bill. For example, AT&T and suppliers of computer-based systems and services disagree about how quickly Bell should be required to transfer its terminal manufacturing, research and development activities from Western Electric Co. and Bell Laboratories to the fully separated subsidiaries established by H.R. 6121.

Levine, in his letter to Staggers, indicated this is one of the disputes the commission could settle if it were given increased discretionary authority.

Senate Dispute

However, AT&T may oppose this change. The Senate communications bill, S. 2827, already contains language allowing the FCC to alter AT&T's structure after enactment of the legislation, and reportedly this is the main reason for the dispute that erupted between the telephone company and the committee earlier this month [CW, July 7]. As a result, the Senate Commerce Committee has indefinitely postponed plans to draft S. 2827 into final form.

The Carter Administration is now trying to resolve the dispute between AT&T and the Senate committee. On July 17, the Commerce Department sent a letter to the committee that suggested retaining the FCC's discretionary authority but making it subject to an "overall plan" and "clear guidelines" established by Congress.

Congressman Rodino's recommendations were contained in a letter to Rep. Lionel Van Deerlin (D-Calif.), chairman of the subcommittee that drafted H.R. 6121.

Congress should not consider deregulating AT&T until after the Justice Department's pending antitrust suit against the phone company is settled, Rodino said.

Settlement in Sight

Pointing out that attorneys for the Justice Department and AT&T have reached "substantial agreement" on the issues, Rodino indicated the trial might be completed "as early as the spring of next year."

The AT&T case is "one of the most important antitrust proceedings brought in the last 50 years." Rodino said, adding that "the chances of a consent settlement of the case . . . are significant, particularly if the possibility of intervening legislation does not deter the parties from entering into serious consent negotiations."

Rodino maintained that if legislation is enacted allowing AT&T to "engage in activities . . . that were previously forbidden," the bargaining positions of the Justice Department and phone company lawyers will "undisputedly be altered" if and when they sit down to negotiate a consent agreement. "By firmly rejecting premature legislative intervention," Rodino added, "Congress can actually encourage consent settlement."

The Computer and Communications Industry Association (CCIA) "supports Chairman Rodino's call for the Congress to defer to the court in resolving the question of AT&T's future structure," said Jack Biddle, president of the association.

"In the course of litigation, the court will undoubtedly have before it a much greater depth of factual material upon which to base a decision than the Congress has thus far reviewed. Certainly CCIA agrees that lifting the 1956 AT&T consent decree before adequate safeguards are in place serves neither the interests of the industry or of the public."

If accepted, Rodino's recommendation would bar AT&T, at least for some time, from offering data processing, data base retrieval and electronic message services, as well as other involving network-resident terminal support and/or information storage.

Furthermore, AT&T would have to continue tariffing all of its terminal equipment offerings, and its freedom to offer intelligent terminals would be limited.

More important, the phone company would run the risk of being forced to alter its present corporate structure even more drastically than is required by the pending legislation.

Both H.R. 6121 and S. 2827 require Bell to establish separate subsidiaries for deregulated services. But the subsidiaries would continue to be owned by AT&T. By comparison, the Justice Department's antitrust suit seeks to break up the Bell System through divestiture. Justice wants AT&T to sell Bell Labs, Western electric and/or other subsidiaries so they can become totally independent companies.

Within the last year, Bell has lost two major antitrust cases. Last November, a federal district court in Bridgeport, Conn., decided unanimously that AT&T and two affiliates had used illegal marketing tactics in an attempt to put Northeastern Telephone Co., an independent telephone and PBX manufacturer, out of business.

Last month, a federal court in Chicago rendered a basically similar verdict against the phone company in a case filed by MCI Communications Corp. While neither decision is final, they are likely to affect the court's disposition of the Justice Department's charges, which are similar to those in the other two cases.

If the government's chances of winning its suit are growing, the telephone company could mitigate the result by accepting the Carter Administration's legislative recommendations.

Freighter Crash Follows Tracking System Shutdown

By Ann Dooley
CW Staff

NEW ORLEANS — The two freighters that collided on the Mississippi River here last week and caused nearby residents to flee toxic fumes leaking from one ship might have avoided each other if an automated vessel tracking system had not been scrapped a week earlier as part of a $37 million federal budget cut.

The collision occurred when an empty freighter of Panamanian registry was moving up the river just as a German freighter was steaming down the river. The German vessel was loaded with powdered hydrobromic acid, which became a toxic gas when it spilled into the water.

Residents of the small town of Shell Beach, La., were immediately evacuated to escape the hydrobromic acid fumes released into the atmosphere after the collision. Although neither the cause of the accident nor damage estimates were immediately available, cleanup operations began at once.

Ordinarily, the U.S. Coast Guard's Vessel Traffic Systems (VTS) would have tracked both freighters at several points along the river, monitoring and advising the ships about coordinates and other ships in the area. Without the system, the river pilots had to rely solely on their bridge-to-bridge radios for navigating around each other.

Rain was falling last Tuesday night when the ships collided, which might also have hampered visibility, one official said.

Whether the VTS would have made a difference will be difficult to determine, but more detailed information might have been available sooner if the system had been operational, officials said.

Ironically, even before the collision, the VTS was given a reprieve. Bowing to pressure from environmental and navigational groups as well as state legislators, the federal government agreed to prolong the system's life, and VTS will begin operating again this week.

Begun in 1977 to keep safety tabs on river traffic between the Gulf of Mexico and Baton Rouge, La., the VTS monitors approximately 250 ships at any one time. When a ship comes into the VTS area either from the sea, a lock or up river, the ship's pilot calls in data to the Coast Guard VTS office. Data such as name of the ship, its destination, point of origin, speed, cargo load and its length is entered into one of eight CRT terminals linked to two Computer Automation, Inc. Naked Minis running in parallel.

The system is programmed to relay information on how quickly a ship will reach certain points and where other ships will be in relation to it. It also indicates what hazardous areas are approaching, such as river bends where it might be unsafe to meet another vessal.

Unlike U.S. air traffic control centers which follow aircraft with radar, the VTS system is voluntary and depends on data radioed in from the vessels.

NEW
WATER ALARM

PROTECTS AGAINST FLOODING

For pennies a day you can protect valuable personal and business property from water damage with the new Water Alarm.

A teaspoon of water beneath the Water Alarm activates its precision electronic water-sensing circuit. Your Water Alarm will blast a high ptiched warning for 48 hours or until reset. The warning sound is intermittent to distinguish it from most smoke alarms. It operates on a 9 volt battery so there is no chance of electrical shock.

To order your Water Alarm, send your check or money order for $34.95 each. This includes shipping, handling and insurance. (Alabama residents add 4% sales tax.)

Credit card buyers may use our toll-free number 1-800-633-8623.
Protect your property today with the new Water Alarm (it even floats).

Send Order to:
Doug Allison
EBSCO Industries, Inc.
P. O. Box 1943
Birmingham, AL 35201

ORDER YOUR WATER ALARM TODAY!
NEW

In Survey of 25 Installations

Users Applaud Amdahl Upkeep, Technical Aid

By Marcia Blumenthal
CW Staff

NEW YORK — Amdahl Corp. users, on the whole, appear to be a satisfied lot, with 54% reporting excellent maintenance and 44% rating the company excellent on technical support.

Recently conducted by Martin Simpson Research Associates, Inc., the survey polled 25 users of 46 Amdahl machines. The survey was undertaken because of the controversy surrounding the long-term outlook for IBM plug-compatible mainframe (PCM) makers.

Price/Performance

Overwhelmingly, price/performance was the reason 72% of the users chose Amdahl systems. And 20% of the users also noted these systems are technologically better than IBM's.

Most users said their original reasons for choosing Amdahl are still valid. However, the researchers pointed out that the future technological superiority of Amdahl equipment is not expected to be as striking as initial introductions. Moreover, some users think that IBM is becoming more competitive and will outflank Amdahl's processor capacity.

More than 60% of the Amdahl systems installed replaced one or more IBM systems. In total, 33 IBM systems were replaced, with 370/158 and 168 equipment replaced most frequently (55%).

The users participating in the survey have an average annual DP budget of $20 million. The majority of them, 63%, have one Amdahl system, but most of the 37% who have two or more Amdahl systems are also operating systems from other mainframe vendors.

About 64% of the Amdahl systems have been installed in the past three years. Amdahl is estimated to have placed about 318 machines to date.

Maintenance Ratings

Besides good price/performance, 54% of the users surveyed rated Amdahl excellent on responsiveness and effectiveness of maintenance service. And 44% said the company's technical support is excellent. Reliability also ranked high with 36% of the users, many citing uptimes of 96% or greater.

While 40% of the users surveyed detected no weaknesses with Amdahl, 36% of the respondents did spell out some weaknesses. In 24% of the responses, users expressed dubiousness because of the general volatility of the PCM situation. However, about 24% of those surveyed had more specific problems — dissatisfaction with either the availability of (8%) or the support for (16%) Amdahl software.

Software Worries

With software becoming an increasingly larger component of a system's price, these concerns could jeopardize the continued attractiveness of Amdahl systems, the researchers forecast.

Users complained that Amdahl does not possess the know-how to debug programs or locate or solve problems quickly. Other weaknesses cited include difficulty locating the right person at Amdahl to whom to report a problem, the quality of the field service personnel, the inability to upgrade the V/6 and the limitation on the number of devices that could be attached to the company's processors.

Interestingly, Amdahl recently made its Virtual Machine Performance Enhancement software available to IBM user without requiring that they also have an Amdahl processor on site [CW, May 19]. Depending on the number and location of these installations, these sites may create a broader geographic distribution the Amdahl's field engineering organization can now support, which may exacerbate an already difficult situation, observers noted.

Despite these shortcomings, 40% of the users said they would select an Amdahl system again. However, 24% said they do not plan to stay with Amdahl because of software or service problems. The remaining 36% were undecided about future choices.

Whatever the ultimate fate of PCM vendors, the research concluded that Amdahl has made a visible dent in IBM's revenues and earnings.

The report estimated that IBM lost $270 million in system sales to Amdahl and forfeited another $800 million in price cuts made as a reaction to Amdahl. This translates to an earnings loss of $290 million or 50 cents per share, the report claimed.

Tom Watson said "Think."

We did!

Tom Watson was a cash register salesman. He founded a company that became the world's leading computer hardware supplier. Tom had a good motto. We've followed Tom's motto. We've thought about your data processing problems and we've created a line of computer software to solve the problems that accompany the hardware that Tom's company builds. For instance, SHADOW II, the world's most advanced T.P. Monitor might just help solve your data communications problems. If you would like to know how, fill in the information requested below and send it to us. We'll send you a free brochure which explains how. Think about it.

☐ Yes, I've thought about it. Please send me a free Shadow II™ Brochure.

Also send me information on:

☐ GUTS™ Timesharing
☐ Quota II™ On-line Programming
☐ CPG™ On-line System Implementation
☐ System/Manager™ DOS/VS Resource Management

Name _____ Title _____
Company _____
Address _____
City _____ State _____ Zip _____
Phone _____
System _____

INSAC
ALTERGO SOFTWARE INC.
1000 Iris Drive
Conyers, Ga. 30207 (404) 922-7235

"Altergo Software - A Division of the INSAC Group"

Programmer 'De-Skilling' Viewed Growing Trend

(Continued from Page 1)

prestige or a crack at the latest systems.

But technological developments, such as the advent of high-level languages and structured programming methods, have allowed vendors and many users to create sophisticated software systems comprised of very simple-minded modules, Kraft noted in a recent interview here.

These modules can now be generated by workers with minimal training in computer technology beyond a few applied courses at the community college or trade school level, the State University of New York/Binghamton professor observed. And, compared to the programming parvenus turned out by universities, these lower paid workers are usually more adaptable to factory-style production environments.

That means a user's management can constrain DP budget inflation, which is especially bad on the budget's labor-intensive software side, and forge tighter controls over software personnel by replacing the older, shining knights of programming's heyday with yeoman coders, grateful for the opportunity, Kraft indicated.

Structured Movement

Computer scientists launched structured programming in the 1960s as an aesthetic movement aimed at making programs more "elegant," meaning more concise and comprehensible, the sociologist noted.

While eminent theoreticians like 1972 Turing Award winner Edsgar W. Dijkstra continue to promote structured programming with evangelistic fervor, DP shopkeepers have warmed to the approach as a means of coping with brisk staff turnover and a nervous feeling that they have less organizational influence than the first-class unstructured programmers in their charge.

According to Kraft, who has studied the relationship between programmers and managers for years, this is partly because program "jumps" — such as Basic and Fortran evoke with GOTO statements — are forbidden by the structured programming canon. When a number of modules within a program jump to each other, flaws in the program's logic can be especially devastating.

This makes debugging difficult and expensive. It also leaves a shop in the lurch when the few people, perhaps only one person, able to comprehend such a jumble take other jobs, Kraft said.

Hence, unstructured users tend to need a more sophisticated — and expensive — class of programmers. Structured users, on the other hand, can assign a less sophisticated crew to each module of a large system under development, Kraft explained.

Roughly speaking, the definitions of three historical periods in the relationship between managers and programmers are starting to gel, Kraft observed.

The programmer had relatively high prestige during the first period — from about 1950 through the 1970s — because he was perceived as a kind of engineer at a time when engineers, as progenitors of the Space Age, were especially revered.

But de-skilling of the software specialties has ushered in the second period, which we now experience. Programmers are being seen as clerical workers and enjoy less prestige, Kraft continued.

The second period is consciously a "waiting period" for managers. While they convert software development shops into factories, information processing executives eagerly anticipate the third period, when software systems will generate other software systems, reducing the need for human programmers to almost nothing.

MIS Managers Not Willing To Give Up Control

By Brad Schultz
CW Staff

BOSTON — Managers are less willing to relinquish control over software functions as those functions come to dominate the MIS budget, sociologist Philip Kraft said in an interview here.

Software development methods like structured programming allow managers to enhance control without sacrificing the raised productivity benefits software is expected to provide, he observed.

Managers now view the organizational impact of highly skilled programmers and systems analysts as a mixed blessing. Software specialists are a lot more expensive to pay since Kraft's book *Programmers and Managers* (Springer-Verlag, New York) appeared in 1977, claiming that employers will act to "de-skill" programming by mandating development techniques that do not require programmers to know much about computer technology.

Continued Demand

For a number of years yet, sophisticated programmers will continue to benefit from a high demand for their skills, Kraft emphasized. But when systems can replace humans as programmers of other systems, less-skilled workers will probably occupy most programming jobs, he speculated.

At that point, older highly skilled programmers will either compete for a dwindling number of positions at the top rungs of the technical career ladder or become managers themselves, Kraft said. Some of the latter will start their own companies — usually service bureaus or consulting firms.

Falling Off Ladder

But many superprogrammers who are determined to stay on the technical ladder are doomed to fall off, Kraft warned. Some may make a career out of systems analysis, since analysts will still be needed to fathom what a long program's myriad parts really do when put together and to lead the design of those parts.

However, the programming wizard who knows 17 languages and has bone-deep rapport with several complicated operating systems will rarely get old and gray in that capacity. At some point, the sociologist pointed out, such expertise will be unnecessary or considered too expensive on the job market.

As for management-bound programmers, they will have their career growth limits too. In years to come, the top managers of information processing will usually be business school graduates, not ex-programmers promoted from the ranks, he said.

The "routinization" of programming may usher in unionization of software development shops as they come to resemble traditional factories, the State University of New York at Binghamton professor stated.

Managers may not be resistant to that trend, he added, since some managers often view unions as a means of disciplining workers and simplifying relations between employer and employees.

Strike Staged in Los Angeles

(Continued from Page 1)

succeeded.

On-line jobs — including the city's crucial police-information system — continued to operate normally, and the municipal government's weekly payroll was processed and delivered exactly according to schedule.

Uneasy Truce

By early Monday morning of last week, the strike had already ended, and operations involving the city's two 6M-byte IBM 370/158s had nearly returned to normal. But even though the worst of the city's short-lived computing crisis appears to be over, both the strikers themselves and their bosses in the upper echelons of local government remain tense and uneasy.

Plans for a second strike are already said to be under way, and rumors that the walkout could last two weeks or longer are reportedly beginning to spread.

If the would-be strikers make good on threats of an extended walkout, the city and its computing services will likely suffer much graver consequences than those of the labor action that just ended. Even with a supervisory skeleton crew again filling in for the regular staff, the city would eventually find itself unable to keep its on-line applications — including critical police- and fire-information systems — up and running indefinitely.

For the moment, though, local officials are still keeping their fingers crossed that the fragile, informal truce now in effect at the city's information systems department will continue to hold and that the grave repercussions of a prolonged work stoppage might yet be avoided.

Like most large American cities, this community is no stranger to strikes by its public employees. This year alone, the roll call of striking workers included the city's building inspectors, mechanics and clerical personnel.

But the recent work stoppage marked the first time in history the city has been forced to deal with a strike by the people who process its data, and fears are already beginning to mount here that the walkout may have set an ominous pattern for the future.

The strike was precipitated by a long-standing dispute over salary. Strikers had demanded a 10.5% pay hike to maintain parity with their state counterparts; they later became disgruntled when they received only 9%.

Attempts to resolve the dispute soon followed, but when municipal officials reputedly struck an uncharacteristically hard-line bargaining stance, an estimated 150 of the city's programmers, analysts and operations personnel suddenly walked off their jobs in disgust. The strikers were later joined for half a day by approximately 50 keypunch operators.

The strikers appear to have staged their walkout with little or no advanced planning and so were forced by economic necessity to return to their jobs after only three days.

OBS WYLBUR® = INCREASED PRODUCTIVITY

FOUR PACKAGES IN ONE TO DECREASE DEVELOPMENT AND TEST TURNAROUND TIME:

- On-line program development
- On-line production job scheduling
- Document formatting
- Interactive word processing

PRICED 30-50% BELOW COMPETITIVE SYSTEMS, WYLBUR* HELPS YOU ATTRACT AND KEEP THE BEST PROGRAMMING TALENT. CONSIDER THESE FEATURES:

- Fast and flexible full screen cursor editing
- Job submit, control and output retrieval
- Dataset maintenance
- Interactive command language
- One- to three-second response time
- A forgiving syntax
- VTAM support
- Low resource consumption

FOR MORE INFORMATION OR A FREE TRIAL CALL (415) 391-9555

*WYLBUR is a trademark of Stanford University

ON-LINE BUSINESS SYSTEMS, INC.
115 Sansome Street, San Francisco, California 94104

H Series Coming Into Focus, Reason for Delay Unclear

(Continued from Page 1)

to be of a mid-range machine code named Iroquois. A 10- to 12-Mips system springing from the combination of two smaller CPUs, the H-2 and H-3, it is being described as a dual-processor system connected to a single storage control unit (SCU) and one memory unit under the storage controller.

CPU, SCU and memory unit will probably all be independent components — meaning the H series will be a "building-block" type of system, where new pieces can be added to build bigger and faster systems.

The Iroquois, a somewhat logical upgrade from the 7-Mips 3033 attached processor (AP) will reportedly be announced during the first quarter of 1981, with first customer shipments expected in the second quarter of 1982. Purchase price is estimated to be in the neighborhood of $5.2 million, according to Strategic Business Services.

The Iroquois, or H-4, is expected to cost about $25,000 for each additional 1M byte of main memory, about half the going price. The processor is believed to sport a 100M byte/sec I/O data rate — about three times that of the current 3033-AP, according to Bob Fertig, an analyst with Advanced Computer Techniques Corp.

Agreeing that IBM will probably introduce the low end of the H line in the second quarter of 1981, Fertig and Strategic Business Systems disagreed on exactly what that announcement would include.

Both agreed the low-end machine will be Catalin (although Fertig preferred to indicate model group numbers after each code name — in this case, Catalin-1). It is said to be the basic unit of the H series, a single CPU, SCU and memory unit offering between 3 and 3.5 Mips plus $1.7 million price tag.

The second step up the H ladder is Lookout, a 5- to 6-Mips processor (either single or dual, depending on which consultant you believe), a single SCU and memory unit.

Fertig parts from Strategic Business Systems on the Lookout outlook because he claims that model will actually be two: Lookout-1 and Lookout-2. Lookout-1 will have the basic qualities reported by Strategic, but Lookout-2 will offer 7.5 to 8 Mips, he said.

Fertig believed the Lookout models H-2 and H-3 would be the basis for the rest of the H line. Strategic agreed with that philosophy, but it claimed the Catalin processor, H-1, and Lookout would be the two main engines.

The next H announcement is believed to be slated for the fourth quarter of 1981, of a model slightly more powerful than the Iroquois.

Called Marcy, the multiprocessor will probably offer 14 to 15 Mips on two Lookout (or H-3, in Fertig's case) engines.

It will probably be the second quarter of 1982 when IBM announces its big guns, Baldwin and Sentinel, analysts are predicting.

Baldwin is said to be essentially an Iroquois, or dual processor, linked as a multiprocessor to a Lookout or Catalin, a uniprocessor.

The top-of-the-line Sentinel will probably be two dual processors connected as a multiprocessor to offer 20 to 21 Mips (Fertig) or 27 Mips (Strategic).

While the IBM analysts agreed on the basic announcement schedule for H, they also agreed it could change at any time. Fertig said another six month-delay in announcement is a real possibility. Strategic said current 30 series users would be the deciding factor in the announcement — whether they buy (literally) IBM's recent price incentives to boost revenue by making it more attractive to purchase a system, rather than leasing or renting it.

The Gartner Group's Stein said both Fertig and Strategic are wrong when it comes to announcements. He said the Iroquois will be announced this year, probably in the fourth quarter, but possibly as soon as four weeks from now. All but the Baldwin and Sentinel models will be announced six months after Iroquois, and the two larger machines will probably be announced in the following year, according to Stein.

IBM Notation	Code Name	Processor Mix	First Shipments	Mips
H-1	Catalin-1	Single	2nd quarter '81	3 - 3.5
H-2	Lookout-1	Single	2nd quarter '81	5.6 - 6
H-3	Lookout-2	Single	2nd quarter '81	7.5 - 8
H-4	Iroquois-2	H-3 & H-2	1st quarter '81	10 - 12
H-5	Marcy-2	2 H-3s	4th quarter '81	14 - 15
H-6	Baldwin-2	2 H-3s & H-2	2nd quarter '82	17.5 - 18
H-7	Sentinel-2	2 H-3s & 2 H-2s	2nd quarter '82	20 - 21

From Advanced Computer Techniques Corp.

1) Announcement dates could slip as much as six months on all models except Iroquois.
2) A higher Mips rating will be noted in a scientific instruction mode.
3) First shipment dates do not reflect volume shipments.

BDS

for your HP*

The BDS line printers are the best cost/effective answer for your Hewlett-Packard computer requirements. BDS offers a complete printer line of *High Quality, Latest Technology* and *Quick Delivery—30 days* in most cases.

The BDS printer systems, with *speeds of 200–1800 LPM* with Matrix, Band, Drum, and ChainTrain Technology afford you the diversification for your exact needs with *savings of 30–50%!*

BDS Controllers and Interfaces are system tested before shipping, thus assuring you trouble free installation. BDS supplies the printer, controller and cable, you simply plug into your HP system and go.

For more specifics from us we need some from you, please **call BDS** (415) 326-2115 or **send us the coupon.** It will be money and time well spent.

(the following companies all have registered trademarks)

- **DEC**
  PDP8
  LSI-11
  PDP-11
  VAX-11/780
  DEC 20
- **BURROUGHS**
  B80/800
  B1700 thru B7800
- **DATA GENERAL**
  Nova
  Eclipse
- * **HP**
  *3000 SERIES 30, 33 SERIES
  *3000, I, II, III SERIES
  *250/300 SERIES
  *1000, 21 MX SERIES
- **IBM**—SERIES 1
- **HONEYWELL**
- **TI - INTERDATA**

and most others

CW 7/28/80

To: **BDS Computer Corporation**
1120 Crane Street
Menlo Park, CA 94025
(415) 326-2115
TWX 9103732005 (BDS MNPK)

The Computer System I Use_____

_____

Name_____

Title_____

Company_____

Street_____

City_____ State_____ Zip_____

Telephone ( ) _____ Ext_____

BDS

I/O Standard Foes Granted Expedited Hearing

By Marcia Blumenthal
CW Staff

WASHINGTON, D.C. — The U.S. Court of Appeals here last week granted a motion for an expedited hearing to four mainframers who are suing the government to prevent the implementation of the controversial I/O interface standards now in effect for federal DP acquisitions.

The mainframers suffered a setback July 2 when the Supreme Court reversed the Court of Appeals decision which allowed a stay of the standards' implementation. That stay delayed the effective date of the standards until such time as the court could resolve the legal issue [CW, July 7].

The Court of Appeals has agreed to hear the appellants during October or November, according to George D. Ruttinger of the law firm Crowell & Moring, which represents Control Data Corp. and the other mainframers.

If the appellate court decides the plaintiffs have standing, the case will be returned to the District Court for rehearing. However, if the court decides to uphold the District Court's prior decision that the plantiffs had no standing, the case would start its journey to the Supreme Court, Ruttinger said.

Lawyers for the mainframers will ask for expedited action in the Supreme Court, he noted.

Because of the reversal of the stay of implementation, the I/O standards are now effective, despite the pending court action.

Vendors contacted last week generally refused to comment on what moves they are making to develop the required interface, acknowledged to be essentially IBM's interface design. It would allow IBM-compatible peripherals to run on the systems of other mainframers.

Firms' Objections

Aside from citing technological obsolescence, some of the mainframers have balked at the cost of developing the interface and accompanying software. In a court case filed last year, Honeywell, Inc. argued it would cost about $25 million to bring its high-end hardware and software into compliance with the regulations [CW, Oct. 22].

Despite these objections, court documents submitted by the government said that federal government users could realize savings of between $40 million and $61 million during the next five years if the standards were implemented.

Although mainframers have said they will comply with the regulation, observers think they will rely on obtaining waivers from the government for the procurement of their equipment, hoping the case will be settled in their favor. "It's the way any business would logically go," a source at one company noted.

However, CDC is said to be planning on complying with the standards by the fourth quarter of 1981, a source noted.

Not for Government Only

Court documents submitted by mainframers indicate the companies cannot redesign the hardware and software for the government market alone. Therefore, commercial users would also have the ability to attach IBM compatible peripherals to other mainframe systems.

The government market is substantial for many of the mainframers. Univac, for example, claims to have about a 25% share of the local and federal government market [CW June 5, 1979].

It appears, then, that mainframers will be relying on waivers to sell into the federal information processing market, at least for the time being.

The current waiver procedure, requiring the Secretary of Commerce to approve all waiver requests, is in the process of being modified. The new regulation places the waiver decision on the chief of the agency procuring the equipment. The National Bureau of Standards (NBS) is now evaluating the comments on the proposed regulation and should make its final recommendation within a month, according to Tom Pike, an offcial with the Institute for Computer Sciences and Technology at the NBS.

Based on comments received, it appears some agency heads do not want to make the final waiver decision, he said.

The NBS can decide to recommend approval of the modified regulations to Secretary of Commerce Philip M. Klutznick, scrap the proposal or issue a new one, restarting the comment period.

Structured Methods Found No Easy Answer for Users

(Continued from Page 1)

grams.

Software maintenance accounted for so much of the service bureau's daily activities, in fact, that Doolittle's programmers seldom got an opportunity to develop new applications or do anything else for that matter.

The effect on staff morale was obvious and predictable. "We were working in a typical government environment at the time," Doolittle recalled "Our staff members were performing just like average civil servants, doing little more than drawing their paychecks and waiting each day for five o'clock to arrive." With the help of an outside consultant — Gopal Kapur of Kapur & Associates, Inc. — their shop's gradual introduction to software engineering and structured methodology began.

Today, only about 37% of the service bureau's computing resources are allocated to software maintenance, compared to 80% two-and-a-half years ago.

The sharp drop in software maintenance requirements has led, in turn, to improved staff morale. "Now, our people walk around with smiles on their faces," Doolittle said. "They do a lot of work, and they do it happily."

Adoption of software engineering and structured methodology has also helped Doolittle and his colleagues to greatly improve their software reliability. The service bureau's staff has written some 50 programs since the conversion began, and during the past two years, those programs have "abended" only twice, the information-systems manager said.

This is the second in a series of articles describing users' experiences — both successful and unsuccessful — with structured methodology.

One of the main reasons for the service bureau's success in implementing software engineering and structured methodology is that the installation's managers never lost their patience; they realized they would not reap benefits from their experiment overnight.

From the beginning, Doolittle and his colleagues understood that their implementation would take time, that they would probably suffer setbacks along the way and that they would have to exercise perseverance and ingenuity if they hoped to overcome those setbacks.

They spent more than a year, for example, experimenting with structured walkthroughs before they finally got the process down pat, he said.

Management Support

A second key to the service bureau's success with software engineering and structured methodology is that efforts to implement the techniques were supported all the way by top management, particularly by Doolittle's boss, Ralph Cook, the installation's information-systems director.

Lack of strong management commitment is one of the leading reasons why attempts to use software engineering and structured methodology so often end in disappointment, Doolittle explained.

Yet another reason for the service bureau's success with software engineering and structured methodology is that Doolittle and his superiors tried to give their subordinates as strong a voice as possible in deciding how the techniques should be implemented. The decision to continue using GOTO statements, for example, was made by the computing center's programmers themselves, not by management flat, Doolittle said.

To Register Four Million Males

Selective Service Recruits IRS Keypunchers

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. – An army of data processing personnel, recruited from several federal agencies, stood ready last week as another generation of American males began lining up for military registration.

The Selective Service System has mustered more than 1,000 key-punchers to process the four million registration cards to be filled out at 34,000 U.S. post offices last week and this week.

Most of the keypunchers are with the Internal Revenue Service (IRS), pressed into service because "we needed to get one organization that can effect the control that's needed in an operation like this," according to David Cox, associate Selective Service director for management information systems (MIS).

The Selective Service began marshaling federal interagency support for the registration when President Carter signed the registration legislation June 27. Congress provided $13.3 million for the three-month effort.

The General Services Administration and the Office of Management and Budget provided technical support and helped arrange the cooperative DP operation that will see IRS-produced tapes processed by the Selective Service on an Interior Department Itel Corp. AS/5 system.

Registration Cards

Prodded by patriotism and possible penalties of five years in jail and $10,000 in fines for not registering, males born in 1960 and 1961 will fill out cards at post offices, supplying name, date of birth, telephone number, social security number and permanent and current address.

The cards, after being checked by Postal Service employees, who will request identification from registrants to verify the information, will be forwarded to some 350 regional postal centers, consolidated and then shipped to six IRS offices for keypunching.

Using internal post office shipping mechanisms, such as used by the Postal Service to transfer money, will provide a certain amount of security for the shipments and guarantee delivery, according to Cox.

The IRS-produced 6,250 bit/in. tapes and the original registration cards will then be shipped to the Selective Service operations center here for processing on the Interior Department's system.

The tapes, received daily from IRS, will be edited for errors. Records containing major errors, such as an address so incomplete as to make correspondence impossible, will be routed through various correction loops.

But most errors will be minor and will not disturb registration, Cox predicted, saying corrections for all but the major errors will be picked up when the service notifies registrants of their registration numbers.

Master File

The basic master file should be assembled within four weeks after registration ends, Cox said. About the first of September, letters of acknowledgment will be sent to the registrants. From that point the Selective Service MIS group will be "getting into a fully operational system in a hurry," Cox said.

Not only will there be constant updates of the file as registrants change addresses, but the next group of registrants, males born in 1962, must register the first week in January. After that all males will register as they turn 18.

By next summer, the Selective Service plans to have its own DP capabilities in Great Lakes, Ill. There it will share computer facilities with the Military Enlistment Processing Command (Mepcom) which, when necessary, tests and inducts draftees.

Colocating with that Defense Department agency will speed military induction in case of mobilization, Cox explained, but the operational staffs and files of the two agencies will be completely separate to comply with privacy law requirements concerning registration records.

'We needed to get one organization that can effect the control that's needed in an operation like this.'

When the two organizations are settled in Illinois next summer, the Selective Service will have augmented its Burroughs Corp. 3500 system with a government surplus IBM 370/168 to complement the Mepcom Univac 1108 systems. Cox's organization will also purchase enough printers and disk and tape drives to handle 1.2G to 1.8G bytes of on-line disk storage and a master tape file containing, by next summer, about six million individual records.

Eventually the service expects to have files on 16 million registrants. Cox's current budget of $5.5 million will approach $11 million for fiscal 1981, reflecting the increased demand on the Selective Service information systems.

PROVEN RECORD OF RELIABILITY
VENDOR SUPPORT · OVERALL SATISFACTION · THROUGHPUT/EFFICIENCY · EASE OF INSTALLATION · DOCUMENTATION
1979
MEMBER
datapro
SOFTWARE
HONOR
ROLL
FDR™
FAST DUMP
RESTORE
FAST DUMP RESTORE
FDR with over 3400 users and nominated to the DATAPRO HONOR ROLL for the 6th consecutive year, has a proven record of RELIABILITY and EFFICIENCY. FDR permits the user more opportunity to back up his files while using significantly less CPU and elapsed time.
COMPAKTOR
A disk management utility which reorganizes disks at FDR speed. COMPAKTOR permits the user to easily position and sequence data sets. Multi-extent data sets are changed to single-extent data sets and the user is also allowed to change both the size and location of a volume's VTOC.
Available for IBM OS, VS and MVS.
For Further Information
or Free 30 Day Trial, Call or Write...
INNOVATION
DATA PROCESSING
970 Clifton Avenue, Clifton, NJ 07013 • 201—777-1940

Sampling of 32-bit Mini Offerings

(Continued from Page 1)

with its introduction of the MV/8000. However, unlike most other 32-bit machine vendors that push their machines as scientific tools, DG is tailoring a significant portion of its marketing effort to the commercial business sector.

According to DG's figures, about 30% of the 32-bit computers currently operating are installed at commercial business sites. The remaining 70% are scattered among scientific, computational and engineering applications. And that ratio is rapidly evening out, Perry stated.

Shipments of 32-bit minicomputers have doubled since last year and will grow about 40% each year until 1983, when the 32-bit market will reach the billion-dollar mark. Presently, 32-bit computers account for approximately 7% of the total mini picture and will expand to a 15% slice in only three years, DG projected.

The fact is there are a lot of commercial business users "that really absolutely need that 32-bit word size for large programs and large data structures and for handling large arrays," Perry added.

However, the 32-bit computer does not threaten to engulf the 16-bit minicomputer market, or add the standard mini to the endangered species list, he cautioned. The 16-bit computer "has a niche" in the area between the highest capacity 8-bit microcomputer and the least expensive 32-bit system.

Further, a lot of users do not need the complexity and overall power of a 32-bit machine. A system with 10 to 16 terminals would probably do well with a 16-bit minicomputer, "where 32-bit computers would overkill and a micro couldn't handle it," Perry observed.

The chart below shows a sampling of what's currently available in the latest 32-bit fashions. Word length is probably the single most important characteristic of each machine and accounts for the high price tags.

Basically, word length refers to the amount of information that can be stored or retrieved from a computer's main storage area during a single cycle. Although not specified in the chart, some of the machines noted operate in a dual word mode and can handle both 16- and 32-bit software to its greatest efficiency.

The memory cycle and memory access times are the minimum time between the starts of two successive accesses to a storage location and the time it takes for a CPU to receive data after it is requested, respectively. Although these times vary, it is important to remember that the computer with the fastest cycle or access speeds is not necessarily the best candidate or

Characteristics / System	Memory Capacity	Memory Cycle Time	Memory Access Time	Instruction Set Size	Cache Memory	I/O Transfer Rate
BTI Computer Systems, Inc. BTI 8000	256K-8M bytes	.67 microsec	.4 microsec	32 bits	None	20M byte/sec
Data General Corp. MV/8000	256K-2M bytes	.11-.22 microsec	27.5 nsec/byte	Up to 80 bits	16K-byte system	2.27M-16.16M byte/sec
Digital Equipment Corp. VAX-11/780	128K-2M bytes	.6 microsec	290 nsec/byte	32 bits	8K-byte system	13.3M byte/sec aggregate rate
Formation, Inc. 4000 Information System	256K-8M bytes	800 nsec	1.2 microsec	Up to 48 bits	None	5M byte/sec
Modular Computer Corp. IV/35-B	128K-1M byte	1.067 microsec/-word	.6 microsec/-word	16 bits	None	7M byte/sec
Modular Computer Corp. IV/35/CP-B	128K-1M byte	1.067 microsec/-word	.6 microsec/-word	16 bits	None	7M byte/sec
Perkin-Elmer Corp. 3220	256K-4M bytes	.34 microsec	**	Up to 96 bits	1K byte (optional)	2M word/sec
Perkin-Elmer Corp. 3240	256K-16M bytes	.5 microsec	.25 microsec	Up to 96 bits	8K bytes	10M word/sec
Perkin-Elmer Corp. 250	512K-1M byte	About 1.0 microsec	About 1.0 microsec	64 bits	2K bytes	2.5M byte/sec
Prime Computer, Inc. 450	256K-1M byte	.75 microsec	.54 microsec	Up to 64 bits	2K bytes	2.5M-byte word/sec
Prime Computer, Inc. 550	256K-2M bytes	.75 microsec	.54 microsec	Up to 64 bits	2K bytes	2.5M-byte word/sec
Prime Computer, Inc. 650	256K-4M bytes	.75 microsec	.54 microsec	Up to 64 bits	2K bytes	2.5M-byte word/sec
Prime Computer, Inc. 750	256K-8M bytes	.75 microsec	.54 microsec	Up to 64 bits	16K bytes	8M-bytes word/sec
Systems Engineering Laboratories, Inc. (Systems) 32/30A	128K-1M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M-byte word/sec
Systems 32/57	256K-1M byte	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M-byte word/sec
Systems 32/75	32K-8M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems 32/77	256K-16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems VPS 3200	256K-16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems VPS 3300	256K-16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Systems VPS 6400	256K-16M bytes	.6 microsec	.3 microsec	Half-word: 16 bits Full-word: 32 bits	None	6.67M word/sec
Wang Laboratories, Inc. VS-B	128K-512K bytes	.66 microsec	About .33 microsec	Half-word: 16 bits Full-word: 32 bits	None	3M byte/sec
Wang VS-F (100)	256K-2M bytes	.66 microsec	About .33 microsec	Half-word: 16 bits Full-word: 32 bits	32K-byte system	3M byte/sec
Wang 2200 VS	128K-2M bytes	.66 microsec	About .33 microsec	Half-word: 16 bits Full-word: 32 bits	None	User-dependent

*Unless specified, prices do not include peripherals. **Not available

Show Vendors 'Spreading the Word'

performer for a particular application. The user's application and a number of mechanical parameters have a large bearing on the potential effectiveness

Product Spotlight

of a 32-bit system.

The instruction set consists of a number of indicators and address parts that, in effect, tell the computer what to do with information and programming data. The larger the instruction set, the more operations and operands a computer can handle.

A cache memory is basically a midpoint for storing various input and output portions of data or a program. The presence of a cache memory usually speeds up the execution time of a processor, making the entire system more suitable for heavy transaction traffic or large terminal number environments.

Next to I/O transfer rate, which is the time it takes for a computer to transfer data to and from peripheral devices, the next important aspect of a system is the number of users it can accommodate. Most of the figures in the chart are recommended numbers and can be expanded. Then again, some machines like Wang Laboratories, Inc.'s 2200VS incorporate special I/O devices that can be expanded to add any number of user terminals.

Finally, and for most users, what's most important are the computer's software languages and price. While most machines use relatively the same languages under their own operating systems, the price tags vary by hundreds of thousands of dollars. As shown by the figures, there are machines to fit a variety of monetary tastes.

	Recommended Number of Users	Programming Languages	Price*
	200	Fortran, Extended Basic, Pascal, Cobol	$86,850
	128	Fortran, PL/I, Basic, Cobol, Extended Basic	$153,150 (512K-byte)
	96	Macro Assembler, Fortran IV Plus, Cobol, Basic	$134,600 (256K-byte and operating system)
	38 (locally)	All IBM 32-byte languages, i.e., Assembler, Cobol, Fortran	$42,500 (256K-byte)
	128	Fortran IV, Cobol, Coral 66	About $203,000 (256K-byte)
	128	Fortran IV, Cobol, Coral 66	$210,560 (256K-byte)
	32	Fortran VII, Cobol, Basic Level II, RPG-II	$33,500 (256K-byte memory plus terminal)
	**	Fortran VII, Cobol, Basic Level II, RPG-II	$85,000 (256K-byte memory plus terminal)
	5-8	Fortran VII, Cobol, Basic Level II, RPG-II	$59,500 (512K-byte)
	31	Basic, Fortran, Cobol, PL/I, RPG-II	$65,000 (256K-byte)
	63	Basic, Fortran, Cobol, PL/I, RPG-II	$70,000 (256K-byte)
	63	Basic, Fortran, Cobol, PL/I, RPG-II	$95,000 (256K-byte)
	63	Basic, Fortran, Cobol, PL/I, RPG-II	$130,000 (512K-byte)
	16	Fortran, Cobol, Basic	$25,100 (128K-byte)
	64	Fortran, Cobol, Basic	$39,500 (256K-byte)
	64	Fortran, Cobol, Basic	$72,300 (128K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$46,300 (256K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$79,000 (256K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$85,000 (256K-byte)
	64	Fortran, Cobol, Basic, Assembler, Macro Assembler, Fortran RTL	$137,500 (256K-byte)
	32	APL, Algol, Basic, Cobol, Fortran, PL/I, RPG-II	$19,000 (128K-byte)
	128	APL, Algol, Basic, Cobol, Fortran, PL/I, RPG-II	$69,000 (256K-byte)
	32	APL, Algol, Basic, Cobol, Fortran, PL/I, RPG-II	$19,000 (128K-byte)

Some Figures Courtesy Datapro Research Corp.

Prime Bases Office System On 32-Bit Mini

The same architectural attributes that make a 32-bit computer a natural for scientific and commercial business applications also make it a shoe-in for the growing office automation field.

Several months ago, Prime Computer, Inc. introduced its office automation system, which is essentially a Prime 550 superminicomputer enhanced with office-oriented software and a number of intelligent terminal and management workstations. The software is mostly geared for sophisticated word processing functions, and the terminals act as limited capacity remote processing sites.

Up and running, the 32-bit-based system does everything from text editing to electronic mail at the Lincoln National Life Insurance Co., a spokesman said.

In October 1979, the company installed a 550-based office automation system at its Fort Wayne, Ind., corporate headquarters. Presently the system handles in excess of 44,000 pieces of paper daily and supports more than 50 interactive terminals, a spokesman said.

Lincoln National installed the system in its data processing department, where management, office workers and secretaries use it for internal communications, tracking and scheduling management functions and word processing. The system is also being used by the firm's law department, the spokesman continued.

Future plans for the system include expanding its terminal base to more than 100 workstations, he added.

Lincoln National's office automation system consists of the 32-bit processor with 1.25M bytes of main memory, one 300M- and one 80M-byte storage disk drive, a 400 line/min printer and a magnetic tape drive. In addition, the system uses Prime's standard multiuser, interactive operating system, Primos, and supports Fortran 77, Basic and Info, an information management package, the spokesman noted.

Western Union Promises Overseas Telex Rate Cuts

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Further rate cuts for U.S. international telex users were promised earlier this month by Western Union Telegraph Co.

Since last fall, the telegraph company has been offering a Low-Cost Routing (LCR) service that provides international telex service to about 100 countries at rates up to 30% less than those charged by U.S. international record carriers (IRC). LCR messages, however, are transmitted to the receiving overseas carriers by CNCP Telecommunications, Inc., a Canadian communications carrier, and by Telexommex, the Mexican telecommunications authority.

Last March, Western Union requested Federal Communications Commission (FCC) permission to eliminate these intermediaries and interconnect with the overseas carriers directly. This month, in response to a request from the commission, the telegraph company supplied further information about the proposed service.

Direct connection with 10 other countries is planned during the first year of operation, Western Union said, and with a total of 30 countries within three years.

Australia, Brazil, France, West Germany, Hong Kong, Italy, Switzerland and the UK are among the first 10, the company added. It said that direct connection should result in rates even lower than those now being charged for LCR service.

This proposed expansion of Western Union's domestic telex service to overseas points was inspired by an FCC decision last December, which reinterpreted Section 222 of the Communications Act of 1934.

Previously, the telegraph company had been barred by Section 222 from offering international telecommunications services. Under the interpretation, however, Western Union is allowed to offer them.

NCC Proposals Due Aug. 25

CHICAGO — Aug. 25 is the deadline for applicants to submit seminar proposals for the Professional Development Seminar series at next year's National Computer Conference (NCC) here.

The theme for NCC 81, slated for May 4-7, 1981 at McCormick Place here, is "Keys to Productivity."

The Professional Development Seminar Series, chaired by George R. Eggert, will cover technical, managerial, productivity and state-of-the-art topics.

An outline, along with a short biography and a black-and-white photo, should be sent to Eggert at the Department of Defense, DCASR, Chicago, O'Hare International Airport, P.O. Box 66475, Chicago, Ill. 60666.

For additional information, Eggert can be reached at (312) 694-3031.

FCC Grants Detariffing Appeal

WASHINGTON, D.C. — Computer-based on-line information services offered by the nation's communications carriers will not be deregulated this month, as had been specified by the recent Federal Communications Commission (FCC) decision in the Second Computer Inquiry [CW, June 16]. Granting petitions filed by Tymnet, Inc. and GTE Telenet Communications Corp., the FCC deferred the effective date until March 1982.

The two value-added carriers had argued that scheduling the detariffing of enhanced services for this month would not have allowed enough time to negotiate new contracts with users. IBM, the Computer and Business Equipment Manufacturers Association (Cbema), Delphi Communications Corp. and Computer Network Corp. opposed the Telenet and Tymnet petitions.

They contended that the relief sought was more far-reaching than necessary and would inhibit the offering of enhanced services by new and existing entities.

The commission agreed in part with this objection. Its order applies only to existing enhanced services; new services will have to be offered on a deregulated basis.

Pennsylvania PUC Delays Forerunner to Bell EMS

By Phil Hirsch
CW Washington Bureau

HARRISBURG, Pa. — The state public utility commission (PUC) has deferred the effective date of a tariff covering Custom Calling Service II, an offering of Pennsylvania Bell Telephone Co. generally regarded as the forerunner of a whole family of AT&T electronic mail and message services (EMS).

Responding to objections from commercial telephone answering services, the Pennsylvania PUC put off the effective date from July 7, 1980 to Jan 7, 1981.

Supporting Material

The supporting material submitted with the original tariff filing "is not adequate to support the conclusion that the rates will be compensatory, the utilities commission said. Analysis of this material by the PUC staff indicated "the proposed rates, rules and regulations may be unlawful, unjust, unreasonable and contrary to the public interest," according to the commission.

Custom Calling Service II would allow the customer to have incoming calls stored within the telephone network when he is away from his phone, or does not wish to receive messages. The customer could also record outgoing messages and have them delivered at a specified time.

In either case, calls could be input and received through Touch-Tone or rotary-dial telephones without any additional hardware of software.

It is significant that Bell plans to convert messages into digital format before storing them. This would permit delivery to conventional data terminals as well as telephones. The storage medium to be used by the network — high-density digital disks — could accept input from facsimile or data terminals as well as telephoned voice messages.

Upper-Income Areas

Pennsylvania Bell plans to offer the new service initially in three upper-income exchange areas of Philadelphia, serving about 14,000 business and residential subscribers.

The company had planned to extend the service to 38 exchanges serving 200,000 patrons by the end of this year, and then, "within two years, to extend it again to half of all telephone subscribers in Philadelphia.

Officials of AT&T Long Lines Department reported recently that as soon as the Pennsylvania Bell tariff is approved, several other Bell operating companies plan to tariff similar services.

Informatics Accounts Payable System is so versatile it can go on-line or on paper.

You get the best batch system you can buy.

And the strongest, most complete on-line system in the industry.

An on-line system that's built-in. Not added on.

You have immediate inquiry to all the essential information in the system.

You don't have to be a computer whiz to use it, either.

Your accounting staff can enter invoices, new vendors, requests for new reports—all directly.

They can also retrieve information for management—in a flash.

Browse through reports. Look up the status of any invoice. Inquire into your vendor master file.

You also get continuing enhancements for overall performance.

Informatics Accounts Payable System is part of the product family that's consistently described by accountants, financial managers and data processing analysts as "easiest to use" and "most flexible" of all of the systems available.

And, since Informatics is the world's largest independent supplier of software products, you're assured of the size and stability to back you up—in the United States and around the world.

For other important facts about our Accounts Payable System, call Tom Roberg at (213) 887-9121. Or Telex: 69-8715.

Or just clip the coupon:

TO: Tom Roberg, Informatics Inc.
21050 Vanowen Street
Canoga Park, CA 91304
Informatics Inc

YES! ☐ Send me more facts about the Accounts Payable System.

Name_____Title_____
Company_____
Address_____
City_____State_____Zip_____
Phone (___)_____CPU_____

Or call Informatics in these areas:
Chicago (312) 298-9300, Dallas (214) 750-0800,
Los Angeles (213) 887-9121, Manchester, N.H. (603) 627-2500,
New York (201) 488-2100, Raleigh (919) 872-7800. AP-CW-72880

CASS CAN WHEN IBM WON'T

See page 91 in Buy/Sell/Swap

Gas Rationing Seen Fueling Long Lines at Banks

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The government's proposed gas rationing plan may put a greater strain on the country's financial computer systems than on its gasoline pumps, according to one group lobbying against the proposal.

The Department of Energy (DOE) plan, now before Congress, would result in "unmitigated chaos," because it would overwhelm the commercial banks that would be called on to implement it, the American Bankers Association (ABA) said in a recent letter to members of Congress.

Unless Congress turns down the plan by July 30, it is automatically approved and DOE will move ahead with preimplementation planning, expected to take about 12 to 18 months and cost as much as $80 million. During a gas crisis, actual implementation of the plan would take another 90 days, according to the department [CW, June 9].

Asking Congress to veto the plan, Gerald Lowrie, ABA executive director, government relations, said the plan would overtax existing banking personnel and data processing systems.

If a gasoline shortfall triggered rationing, the proposal would require an additional 150,000 bank tellers to handle coupons, Lowrie said. And the plan's provision to establish "ration rights checking accounts" could, he said, "literally swamp the nation's payments processing systems."

The checking account proposal would allow companies and individuals to deposit gas ration coupons received from the government and draw "ration rights checks" denominated in gallons of gasoline.

"The major problem with these accounts is logistical," Lowrie said. "There are only about 100 million total checking accounts in the country today, and this proposal could add as many as 170 million more."

Addressing this point in recent Congressional testimony, ABA Gas rationing Task Force Chairman J.C. Welman Jr. said "this provision of the plan is nothing less than absurd.

"Even if only 10% of the eligible population attempted to open ration rights accounts during the 90-day period preceding the implementation of gas rationing," Welman said, "the resulting drain on personnel and additonal paperwork and data processing costs would overwhelm the nation's commercial banking system."

To relieve the potential for chaos, according to the ABA, more coupon issuance and handling points must be designated. The approximately 60,000 commercial banking offices in the country do not have the manpower or backup systems to handle the task alone, the association said.

'Workable' Plan

The Department of Energy, for its part, defended its plan as workable, given enough time to work out the details. DOE points out the plan is still rather broad and said any problems can be ironed out during the preimplementation period.

The ABA countered the plan is still so vague as to be unworkable but sufficiently intimidating in its outline to be unacceptable to the banking community.

In fact, Welman told Congress last month "unless the major operational deficiencies stated or implied in the present plan are remedied by the Department of Energy, we feel certain that few banks will be willing to participate in the implementation of gas rationing."

Welman told *Computerworld*, however, there is little chance banks could escape their responsibilities under the rationing proposal once approved by Congress. This explains why the association has worked so closely with DOE since 1973 in developing a gas rationing scheme, he said.

Welman said in recent testimony he was disappointed that seven years of ABA cooperation with DOE and its predecessor agencies had produced a plan so unacceptable to the banking community.

California Air Control Outages Not 'Solved, Fixed or Stopped'

By Marguerite Zientara
CW Staff

FREMONT, Calif. — Computer outages at the Air Route Traffic Control Center (ARTCC) here resulted in air traffic delays of up to 78 minutes on three occasions within a period of 10 days.

The breakdowns came on the heels of four other major air traffic control (ATC) computer outages here during June, which caused traffic delays and mystified technicians as to their causes [CW, July 14].

Affecting air travelers departing from several northern California airports and as far away as Reno, Nev., the problems began on Thursday, July 10, when the center's IBM 9020A Triplex system "hard-stopped," or stopped processing its electronic instructions, according to Jim Scott, Data Systems Officer at the center.

"We got into a situation like that 10 times, and each of those outages were less than 35 seconds," Scott said. "We have not solved, fixed or stopped it from occurring as far as we know," although the problem has not recurred since July 10, Scott said recently.

Rash of Problems

Although the cause of the problem has not been determined, it is believed to be hardware-related. Whatever the cause, after 10 momentary interruptions between 8:00 a.m. and 9:30 a.m., technicians decided to take the system down for an hour, resulting in 66 known traffic delays.

Delays ranged from three minutes to 78 minutes in length, and affected departures from airports in San Francisco, Oakland, San Jose, Sacramento, Fresno, Monterey — all in California — and Reno, Nev., according to Roger Johnston, public information officer at the ARTCC.

Software-Related?

The next day — Friday, July 11 — a computer outage of one hour and 14 minutes, suspected to be software-related, caused 18 known delays ranging from one minute to 43 minutes and affecting departures from San Francisco, Oakland, Sacramento and Mathers AFB, Johnston said.

Two days after that, on Sunday the 13th, a 36-minute computer outage, thought to be related in nature to the previous one, was responsible for 22 departure delays from San Francisco and three from Oakland, ranging from five to 29 minutes, Johnston said.

Such a "rash of very unusual problems" at Fremont's "generally very reliable" system prompted the facility to call in a three-person team of technical specialists from the Federal Aviation Administration (FAA) Technical Center in Atlantic City, N.J., formerly called the National Aviation Facilities Experimental Center (Nafec), Scott said.

Error Analysis

"What we've done up to this point is designed some software computer logic to trap it and isolate it down to a single program," Scott explained, noting that the problem seems to exist in the system's error analysis program.

"The error analysis program actually scans and looks for software, hardware, whatever kinds of problems and flags it to us," Scott explained.

That would seem to explain the reason why two of the four outages last month, on June 3 and 22, were not reported by the system itself [CW, July 14].

When asked if the recent outages were related to those of last month, however, Scott replied, "I guess we're not that smart yet; we can't pinpoint it that fine.

"It's hard to make a case for any of the previous software problems [being related to] these that just occurred, although we are working toward that kind of end," he added.

Super Sale on Genuine DEC

DISK DRIVES
RP06 • RP05 • RP04 • RP03
RP02 • RK07 • RK06 • RK05
Controllers Available
and
TAPE SYSTEMS
TWE16-EA • TJE16-EA
Call or write Dept. S701CW

NEWMAN COMPUTER EXCHANGE
1250 N. Main P.O. Box 8610, Ann Arbor, MI 48107
(313) 994-3200

SECOND TO NONE IN FAST DELIVERY.

Why wait for a "scheduled delivery"?
We know that when you need it, you need it now. Whether you're a DDP pro in a hurry or a first-time user under the gun, your time's important. That's why our delivery is immediate. From a wide selection of stock on hand

DATA SYSTEMS MARKETING
Your Hardware/Software Distribution Centers

San Diego 714/560-[illegible] Cosa 714/[illegible]-2312, Los Angeles 213/641-2050, East Los Angeles 213/724-6251, Mountain View 415/941-0240, Englewood (Colorado) 303/770-1972, Denver 303/573-5133, Colorado Springs 303/471-1563, Salt Lake City 801/487-8281, Albuquerque 505/292-2911, Phoenix 602/933-0081, Seattle 206/487-3571, Portland 503/640-4883, Norman (Oklahoma) 405/364-9[illegible], Pittsburgh 412/486-2676, Bend (Oregon) 503/389-3812, Dallas 214/243-8812, Main DSM Warehouse 800/532-[illegible] (California only) or 800/854-2684.

OS/RPG II Compiler Now Available

Have OS in your shop but want to run DOS/RPG II? Be smart. Don't go through a costly, time consuming conversion. Go with the PMS OS/RPG II Compiler.

Developed by Policy Management Systems (PMS), the PMS RPG II Compiler allows you to run DOS/RPG II in any OS environment.

Major benefits of the PMS Compiler include:

- No efficiency loss
- No change to source code
- No additional run time overhead
- Auto report feature supported
- Complete maintenance
- Easy installation

To find out how many of the nation's largest corporations feel about the OS/RPG II Compiler, call PMS Marketing (803-748-2521) and ask for George Pocisk.

NEW FROM YOURDON PRESS

THE PRACTICAL GUIDE TO STRUCTURED SYSTEMS DESIGN

The **first** book to link structured design with the important new concepts of structured analysis.

The Practical Guide to Structured Systems Design by Meilir Page Jones examines the high-level structure of systems, transcending the statement level of code. This broad view is the key to producing systems that are maintainable, reliable, adaptable, and low-cost. *Practical Guide* also includes these salient features:

- real-world examples that teach how to apply the structured techn
- an extensive case study that can be used as a system model
- up-to-date refinements of structured design concepts

368 pages; softcover; $19.50; ISBN: 0-917072-17-0

Yourdon Press 1133 Avenue of the Americas NY NY 10036 212 730-2673

SHIPPING INFORMATION: Please specify quantity per title ordered and include 75 cents per book for shipping and handling. Residents of California, New York, and Washington states, please add applicable sales tax. **Orders must be prepaid in U.S. funds.**

☐ Enclosed is $19.50 for my copy of *Practical Guide*.

☐ I'm also interested in structured analysis. Enclosed is $22 for a copy of Tom DeMarco's *Structured Analysis and System Specification*.

☐ Please add me to your books mailing list.

☐ Please send me your catalog of publications.

Name _____

Company _____

Business ☐ or **Home** ☐ **Street** _____

City _____ **State** _____ **Zip** _____

Business ☐ or **Home** ☐ **Telephone** (_____) _____

cw7/80

Yourdon Press 1133 Avenue of the Americas NY NY 10036 212 730-2673

Healthy Turnout of Vendors At Computer Graphics Show Mirrors Growth of Field

By Jeffry Beeler
CW West Coast Bureau

SEATTLE — If recent Siggraph 80 conference is any indication, the health of the computer graphics field has never been better. The show, which is sponsored annually by the Association for Computing Machinery's Special Interest Group on Computer Graphics, drew more vendors, occupied more floor space and boasted a wider array of product exhibits than any other conference in Siggraph's seven-year history.

CW at Siggraph 80

Like the computer industry of which it forms a small part, Siggraph appears at last to be entering a period of rapid growth. Five years ago, the show attracted only 10 vendors and fit easily into a 5,000-square-foot lecture hall at the University of Pennsylvania in Philadelphia.

This year, the conference lured almost 100 graphics hardware and software suppliers and filled 120,000 square feet of the Seattle Center Coliseum, according to Siggraph 80's co-chairman, Harvey Kriloff.

The rapidity of the show's growth has surprised even some of Siggraph's organizers. "When I signed the contract two years ago to hold the conference in the Seattle Coliseum, I was worried about what we would do with all the empty floor space," Kriloff recalled.

"I thought we might have to use curtains to hide some of the open exhibit areas and give the appearance that the vendors were occupying more space than they really were. But as it turned out, the curtains were unnecessary."

Growth of Field

To a large extent, Kriloff explained, Siggraph's growth during the last two or three years mirrors the rapid expansion of the computer graphics field as a whole.

For many of the 6,000 visitors who were expected to attend Siggraph 80 during its five-day run, evidence of the graphics field's recent coming-of-age were everywhere.

On the show floor, visitors could see signs of a new-found maturity in the breadth of Siggraph 80's product exhibit. On display were graphics units of nearly every conceivable size, group and subgroup: CRT terminals (storage tube, raster scan and stroke refresh); pen plotters (drum, flat bed and belt bed); electrostatic printer/plotters; and digitizers.

Variety was also a key feature of Siggraph 80's conference program, which included 16 technical sessions covering graphics-related topics as disparate as algorithms, hardware systems, software and languages, graphics and its impact on business, computer-aided design and manufacturing, standards and raster techniques. The conference program particularly stressed graphics design and user interfaces in an attempt to teach computing professionals how to make displayed data communicate more effectively for the people who use it.

The 16 technical sessions were scheduled to take place during the conference's last three days and were preceded on the first two days by a series of eight tutorials exploring topics like elementary raster graphics, advanced raster graphics, computer-aided design, animation, low-cost graphics and user interfaces.

In general, the advanced tutorials attracted larger crowds than the elementary tutorials — a fact that prompted Kriloff to conclude that Siggraph still appeals more to academic and engineering users than to information system managers, most of whom still know little if anything about computer graphics.

Unit Replaces Tektronix 4014

SEATTLE — A raster-scan replacement for Tektronix, Inc.'s Model 4014 graphics terminal became available recently from the Genisco Computers Division of Genisco Technology Corp.

The G-1000, which was introduced at the Siggraph 80 conference, typically costs about $2,000 less than its Tektronix counterpart, a Genisco spokeswoman said.

In addition to being plug-compatible with the 4014, the G-1000 uses raster-scan technology, unlike the Tektronix unit, which relies on storage-tube technology.

By substituting raster-scan for storage tube techniques, the G-1000 reportedly gains several performance advantages over its Tektronix counterpart. These advantages include the ability to display an image indefinitely without damaging the unit's CRT phosphor, the ability to view displayed data in ordinary ambient light and the ability to do unlimited write-throughs without flicker.

The use of raster-scan technology also allows G-1000 users to selectively erase portions of graphic and alphanumeric images — a capability storage tube terminals lack, the spokeswoman said.

Expandable Unit

At present, the Genisco unit is designed to serve primarily as a simple graphics terminal operating interactively with a local or remote mainframe.

However, because the G-1000 incorporates a Zilog, Inc. Z8001 microprocessor with 16K bytes of random-access storage and 16K bytes of erasable programmable read-only memory, it can be expanded to support floppy-disk storage and various output peripherals, including a plotter and printer.

When the mass storage units and other expansion modules start becoming available during the coming weeks and months, the graphics terminal will be able to double as a complete, stand-

(Continued on Page 15)

Charts at the Touch of a Button?

Graphics User Warns of Unrealistic Expectations

By Jeffry Beeler
CW West Coast Bureau

SEATTLE — Computer graphics systems are neither as powerful nor as easy to operate as many users have mistakenly been led to believe, a speaker noted during the recent Siggraph 80 conference.

Many users who acquire or try to develop an in-house computer graphics capability do so with "unrealistically high expectations" for the outcome, according to June Hament, who heads graphics activities for the Insurance Corp. of America (ICA).

Glowing press reports and overly enthusiastic consultants have given many users the false impression that computer graphics systems are as effortless to operate as typewriters and that they can quickly turn reams of text into easy-to-read charts with just a few simple keystrokes.

Unfortunately for their users, computer graphics systems often fall woefully short of their advertised performance, Hament said during a technical session on graphics' gradual entry into the business world.

Lack of Expertise

The problem with many computer graphics systems is not necessarily that they lack the technological sophistication to perform their assigned tasks. Rather, it is that taking full advantage of the systems' capabilities sometimes requires considerably more computing and programming expertise than the average nontechnical business user is willing or able to muster.

"It's ridiculous right now for people to think they can produce well-formed, meaningful computer graphics with the touch of just one or two buttons," Hament asserted.

"How can we expect that kind of capability to be available on the market when we haven't yet developed the data bases and data-reduction tools to make it possible?"

CW at Siggraph 80

Hament's observations about computer graphics systems and their alleged performance shortcomings are drawn from personal experience. For more than a year, she and her employer, ICA, have been embroiled in the complex and sometimes frustrating process of trying to find and implement a computer graphics system that truly meets their corporate needs.

The implementation, which has yet to be completed, has convinced Hament that suppliers of computer graphics systems sometimes become so preoccupied with developing state-of-the-art technology that they lose track of how that technology is going to be applied.

Lesson Learned

"One of the main lessons we've learned from our experience with computer graphics systems is that vendors in this field sometimes become overly enamored with the theoretical at the expense of the practical," Hament said.

"They become more concerned with the elegance of a technological solution than with the everyday problems their users want to solve."

The first order of business for a computer graphics supplier, then, is to help its customers overcome their corporate difficulties, Hament said.

To achieve this objective, vendors fist have to talk to their users to find out what management tools they need and then fashion a product to meet those needs.

Terminal Debuts

(Continued from Page 14)

alone computing system, the spokeswoman said.

Higher Resolution

The G-1000's 1,024-bit by 792-bit resolution is considerably higher than most nontechnical business and financial management applications require.

As a result, the unit's primary applications will include computer-aided design and manufacturing, circuit-board layout and plot previewing.

But when it soon starts supporting its own peripherals and gains the ability to operate in the stand-alone mode, the G-1000 will have the potential to serve as a general-purpose machine, with business applications accounting for at least part of its total computing work load, a second Genisco spokesman added.

The G-1000, which provides a 60Hz refresh, comes with a 19-in. display, keyboard and a serial, RS-232-compatible interface that transmits 19.2K bit/sec.

In single quantities, the terminal costs $9,995. Shipments of the G-1000 begin in December from Genisco at 3545 Cadillac Ave., Costa Mesa, Calif. 92626.

Terminals from DASI

MODEL #	PURCHASE PRICE	ANNUAL SERVICE	12-MONTH LEASE W/SERVICE
TI 745	$1595.00	$216.00	$ 90.00
TI 765	$2695.00	$312.00	$135.00
TI 810 PKG.	$1855.00	$312.00	$110.00
TI 820 PKG.	$2295.00	$324.00	$100.00
TI 825 PKG.	$1795.00	$252.00	$ 85.00
DEC LA 34	$1275.00	$198.00	$ 70.00
DEC LA 120	$2495.00	$330.00	$136.00
DEC VT 100	$1895.00	$187.00	$105.00
DATAMEDIA DT 80	$2095.00	$187.00	$120.00
LSI ADM 3	$ 850.00	$180.00	$ 50.00
LSI 31	$1370.00	$288.00	$ 75.00
LSI 42	$2095.00	$330.00	$105.00
TTY 43 AAK	$1350.00	$220.00	$ 70.00
HAZELTINE 1420	$ 950.00	$180.00	$ 62.00
HAZELTINE 1510	$1195.00	$204.00	$ 77.00
HAZELTINE 1520	$1450.00	$240.00	$ 96.00
DIABLO 1640	$3195.00	$363.00	$160.00
DIABLO 1650	$3295.00	$363.00	$165.00
HEWLETT-PACKARD 2621A	—	$192.00	$ 80.00
HEWLETT-PACKARD 2621P	—	$324.00	$150.00

• Quantity discounts available • Local stocking warehouses
• 5% Discount C.O.D. • DASI is nationwide with nationwide service

DAS THE DATA TERMINAL AND SYSTEMS PEOPLE

Data Access Systems, Inc. Corporate Offices: Cates Rd. and Camden Ave., Blackwood, N.J. 08012 (609) 228-0700 Toll Free (800) 257-7748
District Offices: Boston — (617) 769-6420 • N.Y.C. — (212) 594-8301 • Rochester — (716) 377-2080 • N.J. — (201) 227-0880 • Phila. — (215) 667-6915 • Wash., D.C. — (301) 459-3377 • Atlanta — (404) 448-5435 • Chic. — (312) 987-0440 • Cleveland — (216) 473-2131 • Detroit — (313) 588-1409 • Dallas — (214) 256-5539 • Houston — (713) 682-5865 • L.A. — (213) 538-4180 • S.F. — (415) 982-5711 • Seattle — (206) 251-5570 • Portland — (503) 644-9800 Denver — (303) 753-0357

30 DAY FREE TRIAL

on Response Time Monitors

Model TRTM and Model 300

See for yourself just how much you can save by monitoring actual response times on your equipment. You may be surprised at the time you are now losing daily, weekly or yearly. Monitors compatible with asynchronous and bisynchronous multidrop terminal networks. Displays minimum, maximum, number, last transactions and maintains running averages.

Use for 30 days - at no cost - and see how you can save.
For details contact

QUESTRONICS INC.
3565 South West Temple, SLC, UT 84115, (801)262-9923
TWX 910-925-4000

129 reasons to buy the new Perkin-Elmer 3220 supermini.

You can build an ultra-high-performance, 128-terminal system on Perkin-Elmer's powerful new 32-bit Model 3220. That's 128 good reasons.
The 129th is our unbelievable low price.

SUPERMINI 32 BIT POWER AT MINI PRICES — Plus:
- **Nationally supported transaction processor with "English" Query and automatic data base recovery.**
- **Application programming and systems design on a "Turnkey" Fixed Price Basis to fit your needs.**
- **Error Correcting Intelligent Disk Controllers with burst mode transfer rates for over 100% increased data access speeds.**
- **Telecommunications network consulting.**
- **DAC Hardware installation and Maintenance in N.Y., N.J., PA., and Conn. (Nationally by Perkin-Elmer).**

Call us now for your quotation on our hardware, software or consulting services.

DIGITAL AMERICAN COMPUTERS®
806 Route 17, Ramsey, New Jersey 07446
Est. 1961 — Our 20th Year
(201) 825-7770 or 825-1300

VICTORY THROUGH VARIETY.

DEC, TI Computers and Terminals, LSI, ADDS, Dataproducts, Hazeltine, Diablo, Qume, Teletype, Televideo, Data General, Datagraphix, Intermec, General Data Comm, Racal-Vadic. We've got 'em all! And software too. That's the good word – pass it on.

DATA SYSTEMS MARKETING
Your Hardware/Software Distribution Centers

San Diego 714/560-9292, Orange County 714/630-2312, Los Angeles 213/641-2050, East Los Angeles 213/794-5257, Mountain View 415/941-0240, Englewood (Colorado) 303/770-1972, Denver 303/573-5133, Colorado Springs 303/471-1563, Salt Lake City 801/487-8281, Albuquerque 505/292-2911, Phoenix 602/833-0061, Seattle 206/487-3571, Portland 503/640-4883, Norman (Oklahoma) 405/364-9883, Pittsburgh 412/486-2676, Bend (Oregon) 503/389-3012, Dallas 214/243-5812, Main DSM Warehouse 800/532-3717 (California only) or 800/854-2684.

Managers Told to Rethink Views on Graphics

By Jeffrey Beeler
CW West Coast Bureau

SEATTLE — Most information system managers still know little if anything about computer graphics, but they can ill afford to continue ignoring the emerging discipline much longer, a speaker noted at the Siggraph 80 conference here recently.

Computer graphics is already beginning to mature into a full-fledged discipline and, as the decade progresses, advancements and growth in the field will continue to accelerate, according to Ken Anderson, publisher of a monthly graphics industry newsletter, "The Anderson Report."

Demand for graphics capabilities will prove especially pronounced in the business world, which during the next few years is likely to emerge as the graphics field's fastest growing market sector, Anderson predicted.

In fact, by the end of the decade,

CW at Siggraph 80

graphics will probably become as indispensable to effective business management as computers themselves are today.

This rapid growth in industry stature will force many formerly indifferent information system managers to rethink their attitudes toward computer graphics and seek new ways of applying the discipline to their companies' management and data handling problems, Anderson said.

'Information Explosion'

One of the industry forces that has contributed most heavily to the increased need for business graphics is the advent of the so-called "information explosion." As computing technology has advanced and the ability to process and regurgitate information has steadily grown, commercial users have found themselves inundated in a rising tide of computer-generated facts and figures.

So great, in fact, has the flood of information — and accompanying paper documents — become that no business executive can possibly hope to review it all. The result is that many managers are finding themselves faced with a growing sea of irrelevant facts and are increasingly unable to extract the key financial information they need.

Computer graphics, however, promises to bring the information explosion at least partially under control by allowing executives to quickly distill the essence of large amounts of business data and by greatly reducing the mass of financial reports and other paper with which managers are now forced to contend each day.

A good computer graphics system, especially one that displays its data in color, can condense reams of printout into a few readily understandable graphs and charts, Anderson said.

Another major industry force that seems to be fueling increased demand for computer graphics is rapidly declining memory costs, which are bringing raster-scan and other types of display terminals within easy financial reach of more and more users.

But before computer graphics can realize its full potential, Anderson said, it must overcome a serious technolgical hurdle: its long-standing shortage of sound, commercially available software.

Developments on the software side of the business graphics field have lagged far behind those in the hardware sector — a phenomenon strikingly reminiscent of the computer industry as a whole.

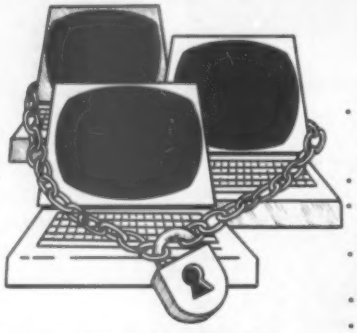
Tandem Users Slate Third Annual Meet

CUPERTINO, Calif. — The third annual international Tandem Computers, Inc. Users Group conference, expected to draw 450 users from the U.S., Canada and Western Europe, will be held in San Diego Sept. 14-18.

Highlights of the five-day gathering will include a keynote address by Tandem Vice-President David R. Mackie and special interest group sessions covering data communications, OEMs, medical applications, Tandem Mumps and international users.

Tandem users wishing further information on the conference can contact Nancy Trankle at 19333 Vallco Parkway, Cupertino, Calif. 95014.

Looking For A Way To Unlock Your Programmer Productivity?



ACEP is a very efficient and easily learned conversational on-line time sharing system. Some of the major features of ACEP include:

- Foreground conversational execution of batch programs.
- Comprehensive text editor with full screen and split screen support.
- No modifications to operating system routines.
- VS1 and MVS operating system support.
- 3270, 2741 and ASCII dial-up terminal support.
- Terminals supported by CICS/VS, VTAM, BTAM and TCAM.
- No JCL restrictions for job submission and retrieval.
- Comprehensive displays of operating system status.
- Ability to enter system console commands from terminals.
- OS/VS utilities run in conversational mode.
- Security at command level and full control of data set access.
- Dynamic allocation of data sets.
- Private PDS libraries for each user.
- Interfaces to several source program maintenance systems.
- SMF accounting routines.
- User-written commands easily added.
- Constantly active "hot" reader for OS/VS1
- Procedure language with labels, arithmetic and string functions.
- Multiple working storage areas for each user.

Read What Other ACEP Users Are Saying:

A Timber Company
*We converted from VM/CMS to ACEP. ACEP is **superior** to VM/CMS and all other products we evaluated.*
When compared with the other products we evaluated, ACEP's response time is exceptionally good.
ACEP uses less resources, responds faster and provides access to everything in the system easily.

A Food Processor
*The response time is great and ACEP is a low overhead system. ACEP is easy to install, flexible and the service is **exceptional.** Our Accounts Payable and Personnel Systems are driven through ACEP.*

A Foreign Oil Company
We evaluated the competition and chose ACEP.

An Oil Company
ACEP supplies our remote users a time sharing capability under CICS/VS.

A Major New York Bank
*ACEP is very **powerful** for the systems programmer.*
*Our service has been very **responsive.***

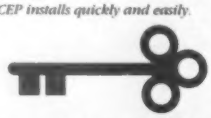
A Theater and Distribution Co.
*We have installed and used three different systems. ACEP is the **best** I have ever worked with.*
We have always been able to do exactly what we wanted, ACEP imposes no restrictions on us.
ACEP installs quickly and easily.

A Major Manufacturer
*We spent many years looking for a system. We evaluated many products before choosing ACEP. It is one of the **cleanest** systems I have worked with.*
I like the way ACEP controls authorization. System security is very good. ACEP has the best editing facilities of all packages available.

A Foreign Oil Company
We have multiple end users interacting with our Data Base Management System through ACEP.

A Title Company
Users that come from TSO shops learn ACEP easily.
*ACEP installation is very **simple.***
*The full and split screen editors are **beautiful.***

*Contact Names Available on Request.



We've Got The Key.

Call or write for your free concepts and facilities manual now.
Get Productive — Go ACEP

LMI

ACEP

Software Module Marketing · Crocker Bank Building Penthouse
1007 Seventh Street · Sacramento, CA 95814 · (916) 441-7234 · Telex 377-314

VAX PDP-11 SOFTWARE

DATA ACQUISITION AND CONVERSION SYSTEM

DACS™

FOR THE LPA11-K HARDWARE ON THE VAX*-11/780 WITH VMS AND PDP-11 WITH RSX-M

SIGNAL TECHNOLOGY, INC.

15 WEST DE LA GUERRA
SANTA BARBARA, CA
93101 • (805) 963-1552

*Registered Trademark of DEC
Digital Equipment Corporation

Funded by National Science Foundation

Project Opens Computer Science Jobs to Women

AUSTIN, Texas — The University of Texas at Austin has been awarded a grant for $132,420 from the National Science Foundation (NSF) to conduct a project for women who want to change from poor-opportunity technical fields to computer science.

The project, which is part of a continuing program, offers self-paced retraining courses and is slated to become part of the university's regular educational program.

Under the NSF guidelines, the university will be funded to recruit and train women in computer science during the 1981-1983 period.

The past two projects at the university, which were also funded by the NSF, have centered around year-long intensive courses in which students attended on either a full-time or part-time basis.

But the special courses demanded one full-time faculty member for the academic year plus two teaching assistants, and the university had difficulty finding and funding qualified faculty, according to Nell Dale, project director. Computer science faculty are scarce since industry offers more attractive salaries than education, Dale noted.

Alternative Solution

To offset the need for teachers, the university proposed an alternative solution, according to Dale. Under the new program, an intensive introduction will be given during the summer preparing the students for more advanced courses in the fall.

Two basic computer science courses will be condensed and offered sequentially in two six-week summer terms.

Condensing, however, will require additional support, according to Dale, and the university is proposing to institutionalize a multimedia, self-paced materials approach to the courses.

Participants will be provided with a variety of learning materials including videotaped lectures, take-home material and audio lectures, which will be available at any time for self-paced reviews. Traditional lectures will also be offered.

With this approach, only one full-time faculty member is needed each summer rather than each year, Dale asserted.

Variety of Backgrounds

The women who enroll in the program come from a variety of backgrounds and will be training primarily to become programmers. Some of the women selected are housewives who want to reenter the work force, and others are from different kinds of work. Many have no advancement possibilities.

Upon completion of the training, the student can either enter the work force or have the necessary background to enter graduate school in computer science. The students can use their newly acquired computer science knowledge in data processing or in work in another field of science, Dale said.

The $132,420 grant awarded to the university by the NSF will help finance the program until 1983 by providing students with full tuition during the summer and stipends throughout the year.

Most of those who have finished the course work under the previous programs have chosen to stay in the Austin area and are working in computer or computer-related fields, according to Dale.

The NSF presented 23 awards, totaling $1,021,011, aimed at increasing the number of women in scientific and technical fields. Although women comprise 51% of the population, only about 10% of the scientific and engineering work force are women.

The awards, made annually under NSF's Women in Science program, will support 17 science career workshops and six science career facilitation projects across the country.

Comnet '81 to Highlight Combining Applications

HOUSTON — Communication Networks 1981 (Comnet '81), which will focus on combining voice, data and message systems applications, will be held at the Albert Thomas Convention Center here Jan. 13-15, 1981.

More than 60 sessions, seminars and workshops are scheduled for the conference.

The program will begin on Jan. 12 with full- and half-day workshops. The conference program will include a keynote series entitled "The Future of Telecommunications" with data, voice and carrier keynote speakers.

If attendees register prior to Nov. 15, the cost is $345 for the three-day conference. After Nov. 15, the price goes up to $395. There is a choice of one of six full-day seminars on Jan. 12, costing $195, or one of five half-day seminars on Jan. 12 costing $95.

More information may be obtained from The Conference Co., 60 Austin St., Newton, Mass. 02160.

Program to Lead Ph.D.s to Careers

CHARLOTTESVILLE, Va. — The University of Virginia has established a summer career opportunities institute for Ph.D. students in the humanities and social sciences.

When they arrive at the university, the students will have completed required reading of texts and articles on accounting, computer systems, marketing, organizational management and policy and social responsibility.

The university hopes to use the program to establish a hiring pool for prospective employers. Tuition for the program is $200, the university said.

ISP

INTERSYSTEM SPOOL PROCESSOR FOR MULTIPLE OS/VS1 SYSTEMS

- Allows each CPU to route output data to any CPU.
- Eliminates need for dedicated card reader, printer and control unit.
- Pools I/O on one CPU to allow JES to optimize available peripherals.
- Transmits output data to subsequent CPU's through shared DASD.
- Compresses redundant data to be transferred.
- Saves space when compared to JES spool.
- Displays number of print lines per data-set.
- Provides flexibility in the processing of input and output.

WATCH THE FAMILY OF TONE PRODUCTS GROW

TONE Software Corp

Call or Write for Details

1124 N. GILBERT
ANAHEIM, CA 92801
(714) 991-9460
TELEX 181-592

Is your "state-of-the-art" industry still collecting antiques?

Today's complex industries require immediate, accurate data on every employee. Concise, up-to-the-minute payroll information is essential. Attendance and manpower loading must be constantly monitored. Yet with old-fashioned mechanical time clocks, instantaneous information is impossible. Now you can improve your data acquisition system with our Data Entry Terminals (DET). They send vital information on your personnel directly into your computer. Panasonic DET's are designed to interface with most existing DP equipment. Available options let you add the special capabilities you need. For more information on our DET Systems*, write or call Panasonic Company, Data Communications Group, 425 Algonquin Road, Arlington Heights, IL 60005, (312) 364-7900 extension 304.

*Distributor inquiries invited.

Panasonic DET: The real time, on-line time clock.

Panasonic. just slightly ahead of our time

NO PRESSURE SELLING, SCOUTS HONOR.

You're among friends at DSM. And, as in all good businesses, friends tell friends. There's no pressure. Ever.

Because we don't have to push anyone's line we can provide either complete systems or individual components. And every piece of hardware is fully covered by the manufacturer's guarantee.

DATA SYSTEMS MARKETING
Your Hardware/Software Distribution Centers

San Diego 714/565-[illegible], Orange [illegible] 714/[illegible]-2312, Los Angeles 213/641-2050, East L[illegible] 213/[illegible], Mountain View 415/941-0240, Englewood (Colorado) 303/770-1972, Denver 303/573-5133, Colorado Springs 303/471-1583, Salt Lake City 801/487-8281, Albuquerque 505/292-2911, Phoenix 602/833-0081, Seattle 206/467-3571, Portland 503/640-4883, Norman (Oklahoma) 405/364-9803, Pittsburgh 412/486-2676, Bend (Oregon) 503/388-3812, Dallas 214/243-0812, Main DSM Warehouse 800/538-3717 (California only) or 800/854-2684.

Wats Service May Face Demise in September

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — By the end of September, the Federal Communications Commission (FCC) must decide what it wants to do about the resale and sharing of Wide-Area Telephone Service (Wats).

One possible result is that AT&T will terminate Wats, as it already has been permitted to do in the case of Telpak (see story on Page 47). For the Wats users, who include many operators of on-line computer-based services, this could mean a substantial rate increase.

The importance of Wats to the computer community is indicated by this excerpt from a recent comment GTE Telenet Communications Corp. submitted to the commission:

Wats, often referred to as "800 service," is "used extensively in support of reservation systems, catalog merchandise ordering systems, credit authorization systems and similar consumer-oriented business services," GTE Telenet pointed out.

"A related principal use of 800 service is . . . in support of remote-access computer applications, including message system, data base inquiry systems, remote batch computing and interactive time-sharing."

Web of Rulings

The antecedents of the Wats controversy are buried in a tangled web of court decisions and FCC rulings stretching back many years. At the bottom is a service that allows users with large volumes of voice and data traffic to lease long-distance service at bulk rates far lower than the time-and-distance charges they would pay otherwise for each call.

The resale and sharing question first arose in 1977 when MCI Telecommunications Corp., said to be AT&T's chief nemesis, won the right to offer Execunet service after a long fight with AT&T and the FCC. Execunet involves the resale by MCI of Bell local exchange facilities connected to MCI intercity circuits.

In 1978, the FCC began an inquiry (Docket 78-72) into the question of whether MTS and/or Wats should be provided on a sole-source basis.

Related Issues

Besides resale and sharing, this proceeding was designed to explore a number of related issues — such as whether the responsibility for divvying up interstate telephone revenues should be transferred from the carriers to a government entity, and whether the rate-averaging scheme long used to give rural and urban telephone subscribers equivalent rates for like services should be changed.

By early this year, it became evident that this proceeding would not be concluded for some time. So the commission decided on a shortcut — a separate inquiry concerned only with the question of whether Wats and MTS services should be shared or resold.

Two-Pronged Attack

Largely, the commission was motivated by MCI, which earlier had launched a two-pronged attack on Wats. One prong was a petition to the U.S. Court of Appeals asking for review of prior FCC decisions concerning Wats rates.

Essentially, MCI complained that although the commission had repeatedly found the rates to be unlawful, they remained in effect — allegedly because of footdragging on the part of both the commission and AT&T. (The disputed rates, incidentally, are still in effect).

MCI also proposed to the FCC in July 1979 that it remove the resale and sharing restrictions on Wats. "Direct rate regulation has proven totally ineffective with respect to Wats," MCI argued.

Removing the restrictions would let the marketplace "correct the anticompetitive anomalies." The company added that if the commission considered this medicine too strong, it should permit resale and sharing of Wats on a trial basis.

The upshot was the commission's decision last February launching the present inquiry. Basically, this proceeding addresses two questions: whether the restrictions should be lifted on Wats and/or MTS; and whether resale and sharing of Wats should be permitted on a trial basis.

Last May, interested parties submitted comments on these questions, and early this month, replies to these first-round comments were filed by most of the participants.

Comment Summary

Here is a summary of what was said:

GTE Telenet: "Among all communication services today, only 800 service in its present form" allows the calling party to make toll-free long-distance calls without operator assistance to a specified subscriber location from any telephone within a specified geographic region.

Thus, "there exists no functional equivalent to 800 service, insofar as data transmission is concerned.

"The voice-oriented procedures inherent in the MTS network are totally unworkable for data transmission purposes. To force them upon data customers . . . through . . . regulatory actions which might compel the withdrawal of 800 service would disserve the public interest."

GTE Telenet also argued that

Lay Down The Law To Your EDP Dept.
(THEY'LL LOVE YOU FOR IT.)

In order for your staff to come up with the right result, they need the right direction. Give them a set of Cara Corp. Systems Development Standards, and they'll be off and running. It provides them with the framework they need to bring your project in on time, within budget, and with all future needs provided for.

Cara Systems Development Standards offers the most simplified disciplines and reliable reference procedures in the industry. In most cases, our clients realize between 30 and 40% lower maintenance costs and experience significant productivity increase from their entire project teams.

Cara Corporation's systems are industry proven and employ "state of the art" techniques.

If you want to point your staff in the right direction right now, call us.

CARA CORPORATION
1010 Jorie Blvd. • Oak Brook, IL 60521 • 312/654-2405

data rentals/sales, inc.

We are authorized TEXAS INSTRUMENTS Distributors with a Complete Inventory

GSA Contract No. GS-OOC-01756

Also Available
TELETYPE 43 DECWRITER IV CRT'S 212A & 202S MODEMS

LOS ANGELES, CA (213) 559-1922 ORANGE COUNTY, CA (714) 754-5770 CHARLOTTE, NC (704) 536-7533 TAMPA, FL (813) 934-0929
SAN FRANCISCO, CA (415) 697-4911 MANHATTAN (212) 925-6046 BALTIMORE, MD (301) 992-5808 CHICAGO (312) 568-3781

OUTSIDE CALIFORNIA, CALL TOLL-FREE (800) 421-4505 OUTSIDE FLORIDA (800) 237-9603

P.O. Box 3257, Culver City, CA 90230

MUST SELL T.I. 765's

Warehouse Clearance
Texas Instruments 765 Bubble Memory Terminals
Must Sell Immediately Overstocked
Lowest Price in the country until inventory is adjusted.
CALL NOW

When FCC Decides on Resale and Sharing

MCI and the other specialized carriers who want the Wats restrictions removed have not indicated they would provide a like offering if AT&T decides to terminate Wats.

Furthermore, although the Wats tariff is anticompetitive, there are other remedies available — the phone company, for example, is required by a court order, growing out of MCI's 1979 court suit, to come up with a new Wats tariff next month.

'Strong Incentive'

MCI: "It is painfully apparent that AT&T needs a strong economic incentive to play the game according to the rules. Resale will create such an incentive.

This "incentive," MCI explained, would come from the competition created by resale and sharing: "if one carrier's bulk rate is too high, its competitors will sell under it, but if it is below costs the competitors will buy the underpriced service and resell it.

"The carrier must therefore price its services at cost in order to avoid these competitive reactions."

Allowing unlimited resale of Wats and MTS will also "result in a major relaxation of barriers to entry into telecommunications," MCI added.

"The investment required to construct transmission facilities is a substantial barrier," and eliminates the need for such investment.

AT&T Stance

AT&T: "It is imperative that the commission in no event order resale and sharing of Wats without the prior implementation of a restructured . . . Wats tariff."

Use of the present tariff, the phone company explained, would allow resellers and sharers to provide long-distance service to present MTS customers at rates substantially below MTS rates, causing a massive migration from that service which would result in "huge revenue losses and cost increases" to AT&T.

Even with a new Wats tariff, however, a trial of resale and sharing is needed before the restrictions are permanently lifted, the phone company added.

The reason: "Even with a restructured tariff, it is impossible to predict the precise nature of arbitrage [resale] activities."

And the trial must be carefully designed "to limit the risk of harm." AT&T offered several suggestions along this line.

The National Telecommunications and Information Administration (NTIA), the President's chief telecommunications adviser, "believes that the benefits of resale far outweigh any potential detriments, and therefore further theoretical studies or a time-consuming, limited market trial would not be the most efficient . . . effective way to proceed."

Regarding AT&T's argument that the trial should not begin until changes are made to the existing tariff, NTIA said it supports the changes in principle. However, "we do not agree that these must be conditions precedent to the implementation of full resale."

One major benefit of resale, the agency added, would be to allow smaller volume telecommunications users to share sophisticated PBX equipment, and thereby exploit such services as minimum-cost routing of toll calls, automatic call distribution, call restriction, metered billing, storing and forwarding of voice messages, call conferencing, centralized answering and recording.

Southern Pacific Communications (SPC): "AT&T's proposed market trial is unnecessary, would yield meaningless results, and its design is flawed in numerous respects."

Furthermore, if resale and sharing is deferred until after a new Wats tariff is adopted, as desired by the phone company, "there is very little reason for AT&T to fully cooperate in the commission's review of that filing" since delay of the tariff would also delay resale and sharing.

On the other hand, if resale and sharing became effective under the present tariff, SPC said AT&T would have an incentive to get a new tariff adopted quickly, for "the more AT&T is convinced that its massive revenue loss projections are correct, the more this regulatory benefit of resale and sharing would seem to apply."

TEXT PROCESSING SOFTWARE FOR THE

IBM 4300

If you are planning to install an IBM 4300 computer, use this coupon to get FREE information about Bowne's 4300 text processing and records management software. Mail to Manager; Software.

Name Title

Firm Phone

Address

City

State & Zip

Bowne Information Systems

160 Water Street, New York, N.Y. 10038 212 952 4400

The Pascal Software Tool

OMSI PASCAL V1.2™

The value of Pascal in computer software design is becoming widely recognized. And our new V1.2 version contains significant enhancements in ease of operation and reliability. Consider the V1.2 Symbolic Debugger.

Pascal debugging should be performed in Pascal, not with assembler listings and memory maps. Our Debugger knows your data names and structures. Values are accepted and displayed in Pascal notation, including scalars, sets, arrays, records, and pointers.

Complete interactive control displays your original source lines, including embedded comments. Breakpoints give statement numbers and procedure names, rather than octal addresses. The Debugger can show the program execution history, including all stacked procedure calls. Should fatal errors occur, they are intercepted by the Debugger instead of ending your testing.

For more information on our approach, ask for the complete OMSI Pascal V1.2 Product Description.

Oregon Software

2340 S.W. Canyon Road • Portland, Oregon 97201
(503) 226-7760 • TWX 910-464-4779

INTERNATIONAL DISTRIBUTORS

Australia: Sydney; Network Computer Services 290-3677

Canada: Vancouver; Valley Software (604) 291-0851

England: London; Real Time Products 01-568-0687

Japan: Tokyo; Rikei Corporation 03-345-1411

Electronic Mail Slated as Topic Of Symposium

CAMBRIDGE, Mass. — The fourth annual symposium on electronic mail will be held on Sept. 16-17 in New York and on Sept. 23-24 in Palo Alto, Calif., by its sponsor, The Yankee Group.

The symposium will examine user strategies for testing and implementing electronic mail and will demonstrate its cost-effectiveness and increased management productivity capabilities.

The "Integrating Electronic Mail" seminar costs $650. For information and registration, contact Marjorie Sugarman, The Yankee Group, P.O. Box 43, Cambridge, Mass. 02138.

Efta Plans Debit Card Meet

WASHINGTON, D.C. — The Electronic Funds Transfer Association (Efta) will hold a Debit Card I Conference Sept. 7-9 at the Capital Hilton Hotel here.

The conference will be the first in a series sponsored by the organization. Subjects to be addressed include credit restrictions, check processing and national credit card programs, such as Visa, Efta said.

The organization is located at Suite 502, 1029 Vermont Ave., N.W., Washington, D.C. 20005.

CPUs, CRTs, PRINTERS AND MULTIPLEXERS ALL ON HAND.

The lines we carry are all in stock. In fact, many times you can take your hardware with you when you go. Our inventory is your selection. Your good word is our best salesman.

DATA SYSTEMS MARKETING
Your Hardware/Software Distribution Centers

San Diego 714/560-9222, Orange County 714/540-2312, Los Angeles 213/645-2050, East Los Angeles 213/794-5257, Mountain View 415/941-0240, Englewood (Colorado) 303/770-1972, Denver 303/573-5133, Colorado Springs 303/471-1583, Salt Lake City 801/487-8281, Albuquerque 505/292-2911, Phoenix 602/833-0061, Seattle 206/487-3571, Portland 503/640-4883, Norman (Oklahoma) 405/364-9803, Pittsburgh 412/486-2676, Bend (Oregon) 503/388-3612, Dallas 214/243-0812, Main DSM Warehouse 800/532-3717 (California only) or 800/854-2684.

Managers on the Move

JAMES T. DRUMMONDS has been promoted to manager, computer equipment evaluation, in the corporate information systems planning department at R.J. Reynolds Industries, Inc. of Winston-Salem, N.C.

Drummonds is responsible for reviewing planning and financing for Reynolds and its diversified operating units. He had been project manager of equipment planning since 1978.

He earned a B.A. in physics from Texas Christian University and an M.S. in computer science from the University of Colorado.

• • •

CHRIS D. ERICKSON has been elected vice-president of Information Systems of GTE Service Corp., a subsidiary of General Telephone & Electronics Corp. at Stamford, Conn.

Prior to the election, he was network director of General Telephone Co. of the Northwest, a GTE telephone operating subsidiary. He joined the GTE organization in 1970 as a management assistant in the development program of General Telephone of the Northwest.

Erickson received a B.S. from the University of Washington and an M.S. in business administration from the University of California Los Angeles

• • •

JAMES F. MCALOON was elected second vice-president of Continental Bank's systems operations area.

He joined the Chicago bank in 1972 as a management trainee; later he was promoted to systems officer in 1978.

McAloon graduated from the University of Illinois at Chicago with a B.S. in management and holds an M.B.A. in systems from De Paul University of Chicago.

• • •

BOB D. GALLEY has been appointed data processing coordinator for Farmland Foods, Inc. and Farmland Agriservices, Inc. at the Kansas City, Mo. headquarters. He will be responsible for coordinating data processing operations as well as new applications development for the two Farmland Industries, Inc. subsidiary companies.

He joined Farmland in 1978 as manager of operations in the data processing division. He was previously employed as an information systems development manager at Wilson Foods and at IBM in production control and systems management.

• • •

ROBERT C. WHITEHEAD has been promoted vice-president, automated banking services, while JOHN D. RUMSEY, operations, and CLARENCE J. SHEPPARD, automated banking services, were named operations officers at Trusco Data Systems, (TDS), the information organization of the Trust Co. of Georgia.

Whitehead joined the staff of Trust Co. of Georgia in 1969 as a management trainee and later served in Augusta, Ga., as a TDS representative where he was elected an operations officer in 1973. He returned to Atlanta in 1974 where he was promoted to assistant vice-president and named manager of automated banking services. He graduated from the University of Georgia with a B.B.A.

Sheppard has rejoined the company earlier this year after being employed by First National Bank of McDonough, Ga., as auditor and First State Bank of Stockbridge, Ga., as executive vice-president and cashier. He was originally employed by the Trust in 1948, where he served as bookkeeper, auditor and in loan operations.

• • •

JOEL RUBIN has been promoted to director of methods and procedures for Avis Car Leasing in Garden City, N.Y.

Rubin joined Avis in 1974 as senior systems analyst in corporate information services and was promoted to manager of systems plan and analysis for Avis Car Leasing in 1978. Prior to joining the company, he was a systems analyst with Consolidated Edison in New York.

Rubin holds a B.A. in Economics from Queens College.

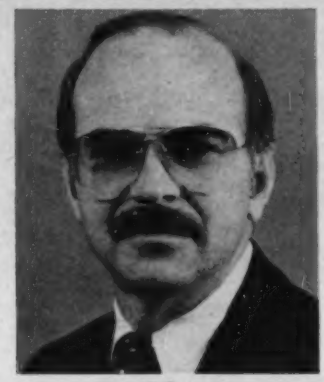
• • •

WILLIAM M. JORDAN III has been promoted to senior equipment planning analyst in the corporate information planning department at R.J. Reynolds Industries, Inc. in Winston-Salem, N.C.

Jordan joined Reynolds Industries in 1977. Until his most recent appointment, he was a systems analyst with the company.

He holds a B.S. degree in physics from Elon College and an M.S. degree in physics from Wake Forest University.

Drummonds



Galley

Whitehead

You Ought To Be In Pictures.

Computer graphics sure beats searching stacks of printouts. You get the total picture, not just a bunch of numbers. Quickly. Accurately. Easily. Using ISSCO's DISSPLA® graphics software, the typical plot requires less than 10 instructions. DISSPLA works on most large scale computers and a selected number of superminis. It drives any plotting device that can draw a straight line to produce quality graphs and charts. Now for non-programmers there's TELL-A-GRAF® for virtual IBM and DEC systems. Plain English commands easily generate bar, column, line, surface and pie charts without the need for a programmer or artist.

ISSCO®

Integrated Software Systems Corporation
4186 Sorrento Valley Boulevard
San Diego, CA 92121 (714) 452-0170
ISSCO Deutschland GmbH
Dietzstrasse 16
D-5400 Koblenz, West Germany
49-261-407989 Telex: 862891

LEADING THE WORLD IN MACHINE AND DEVICE INDEPENDENT GRAPHICS SOFTWARE FOR OVER A DECADE. 10 1970-1980

Tell me more about ☐ DISSPLA® ☐ TELL-A-GRAF®
Name ____ Title ____ Address ____ City ____ St. ____ Zip ____ Telephone ____ Computer ____ Operating System ____

the **uniq** system breaks the unix* price barrier

SOFTWARE: **UNIX*** Version 7 Four User License
RT-11 License

CONFIGURATION: PDP-11/23AA Processor
256 Kbytes of MOS Memory
Floating Point Processor
Dual 5 Mbyte RL01 Removable Disk Drives
H9612 Cabinet
VT100 80/132 Characters per Line CRT
VT1XX Extended Video Option
DLV11-J 4 Port Serial I/O Interface
300 LPM Impact Printer

LIST PRICE: $34,320.00
With Dual 10 Mbyte Disk Drives: $38,100.00

*UNIX is a trademark of Bell Laboratories

uniq Computer Corporation
(312) 879-1566

A SUBSIDIARY OF digital systems house • 143 First Street • Batavia, IL 60510

Computer Fraud Scheme

Three Charged in $500,000 Coca-Cola Theft

By Ann Dooley
CW Staff

MIAMI — After a year-long investigation, three former computer room employees have been charged with using the Coca-Cola Bottling Co. of Miami's computer system here to steal an estimated $500,000 in company products.

Charged with 19 counts of grand theft were Mike Jimenez, Chris Ienco and Mike Torres. The trio will face trial on Aug. 4 in the Circuit Court of Dade County.

The arrests came as a result of testimony form a Coke truck driver who admitted participating in the alleged scam. The driver, who also pleaded guilty to eight counts of grand theft, traded the information for a two-year suspended sentence, sources said.

Although Coke officials declined to comment on the matter, other sources said the alleged swindle was discovered in 1978 during the bottling company's first routine audit — just six months after installing a computer system to automate the firm's old manual accounting system.

The audit showed several large discrepancies in the ordering and billing system and pointed to conflicts in the route of one truck driver in particular.

But before Coke officials could confront truck driver Julio Alvarez with the evidence, a fire ripped through the firm's computer record storage area, destroying many of the printouts to be used as evidence, sources explained.

The alleged fraud was perpetrated by printing phony invoices, creating fake customer accounts in the data base and then, once truckloads of soft drinks were dispatched, eliminating the accounts from the system. The soft drinks were then allegedly sold illegally, metro detectives said.

Fictitious Orders

Circuit court documents and testimony show that fictitious orders were created for some of the firm's larger accounts such as Delta and Braniff Airlines.

The soft drink orders were allegedly filled by employees believing them to be valid and sent out, primarily on the Alvarez route. A forged delivery receipt was returned alleging the goods were delivered to the legal customer, detectives claim.

Records indicate that a bill was posted to the computer's account for that customer, thus clearing up the Coca-Cola accounting records, but before being sent to the airlines, the amount due was allegedly erased.

In this way, the customer would not be charged for something never received and Coca-Cola collected no unauthorized money but was minus the unaccounted load of soft drinks.

Planned Museum to Pay Tribute To History of Computer Science

By a CW Staff Writer

MAYNARD, Mass. — The nation's first large museum devoted exclusively to the history of computer science may rise "like the mushroom cloud of an atomic explosion" in this New England town.

So said a spokesman for the Computer Science Museum project planned by a nonprofit business investment group (BIG) as a tribute to the industry that has given many communities on the outskirts of Boston an economic explosion during the past quarter-century.

Maynard BIG, Inc. has asked most computer firms in the area to financially back the program, which is intended to educate the public and serve as a tourist attraction, according to Paul Connelly, a Prime Computer, Inc. executive who is leading the effort.

Range of Exhibits

The museum will exhibit calculating tools from prehistoric times and other periods prior to the industrial age that began about 200 years ago.

Electronic computing equipment of the vacuum-tube generation will also be displayed along with the first transistor-based hardware and other digital gear through the present state of the art.

Maynard BIG estimates that the museum will cost nearly $390,000 per year to run. But 130,000 adults paying an admission charge of $2 each plus 130,000 children paying $1 each would keep the organization in the black each year.

Maynard's Board of Selectman may grant some helpful appropriations if impact studies presently under way recommend such involvement, Maynard BIG Executive Director Samuel Davis added.

The project is not affiliated with Digital Equipment Corp. or Data Terminal Systems, Inc., which have their headquarters in Maynard.

More information is available from Davis, at Maynard BIG, 74 Main St., Maynard, Mass. 01754.

Afips Names Paul Raisig As Executive Director

WASHINGTON, D.C. — The American Federation of Information Processing Societies (Afips) has named Paul J. Raisig Jr. executive director of that organization.

Raisig will succeed Jerry L. Koory, who has been serving as acting director since last March.

Raisig has served as consultant in the Office of the Secretary of Defense and to the Army Chief of Staff at the Pentagon.

He also served as the principal executive in charge of data processing at a Washington-based life insurance firm, according to Afips.

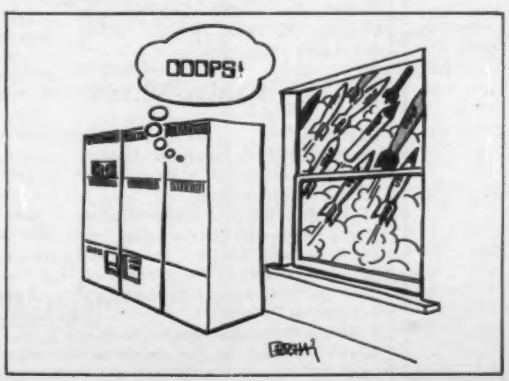
Comtec Elects Officers

ATLANTA — The Computer Micrographic Technology (Comtec) organization announced its new officers for 1980-1981 at its 10th annual conference held here recently.

Officers include president George Michael, director of the Computer Research Group, Laurence Livermore Labs; vice-president, J. Robert Druktanis, systems analyst, Abbott Laboratories; secretary, C.W. Collins, illustration/production manager, Boeing Aerospace Co.; and treasurer, Jeanine Parris, Photographic Sciences Corp.

Other members of the board were presented and several awards were announced.

Comtec headquarters is located at 290 Fischer Ave., Costa Mesa, Calif. 92626.



ANDOVER
DATA SERVICES, INC.

MEMO TO: ALL EDP AND OPERATIONS MANAGERS
FROM: ANDOVER DATA SERVICES

Reminder, ANDOVER DATA SERVICES offers the most in quality data processing services. We are open 24 hours a day, 365 days a year. Twenty-four hour turn-around is standard operating procedure.

KEY ENTRY
Nine Entrex 480/580 Systems
100 Key stations in New York City
60 Key stations in Washington D.C.
Data Communications Capabilities

DISASTER BACKUP DATA ENTRY SERVICES
Our facilities are available as your Disaster Backup Data Entry System. Why not spend a few minutes and find out what this Backup Insurance is all about.

To find out how we can be of further help to you, please give me a call.

Sincerely,
Edith Helbig

OUR THREE LOCATIONS ARE:
145 EAST 52ND STREET, NEW YORK, N.Y. 10018, 212-593-1321
4 WORLD TRADE CENTER, NEW YORK, N.Y. 10048, 212-593-1321
630 QUINCE ORCHARD ROAD, GAITHERSBURG, MARYLAND 20760, 301-948-4770

THE TRUTH ABOUT COMPUTER PERFORMANCE.

Find out for yourself. Try before you buy at one of our many showrooms. We have qualified technicians on staff to assist and advise you. We care. Ask around and find out. You'll recommend us, too.

DATA SYSTEMS MARKETING
Your Hardware/Software Distribution Centers.

San Diego 714/560-[illegible]-2312, Los Angeles 213/641-2050, East Los Angeles 213/724-5[illegible], Mountain View 415/941-0240, Englewood (Colorado) 303/770-1972, Denver 303/573-5133, Colorado Springs 303/471-1503, Salt Lake City 801/487-8281, Albuquerque 505/292-2911, Phoenix 602/833-0061, Seattle 206/487-3571, Portland 503/640-4883, Norman (Oklahoma) 405/364-6803, Pittsburgh 412/486-2676, Bend (Oregon) 503/389-3612, Dallas 214/243-0612, Main DSM Warehouse 800/538-3717 (California only) or 800/854-2684.

The Madzar Z9600. The Z that out performs any other modem for all your short haul trips around town. We're so positive you'll agree, that it's yours on credit approved *30-day free trial.* And this is what you'll get:

■ Up to 9600 BPS ■ Up to 10 mile range ■ Self Test ■ Transmit & Receive Indicator ■ Power Indicator Light ■ Only $117 @ 50 pcs to $167 unit quantity

For further information call or write MADZAR Corporation, 37490 Glenmoor Dr., Fremont, CA 94536, (415) 794-7400

MADZAR CORPORATION

TEST DRIVE THE NEW MADZAR Z.

THE LOW MILEAGE, HIGH PERFORMANCE MODEM. $117

IMMEDIATE DELIVERY

Terminals IBM 3101 **TTY Compatible**

MONTHLY RENTAL

MODEL	PUR. PRICE	1 YR	2 YR	3 YR
12	$1420	$63.50	$55.50	$53.00
22	$1620	$73.00	$64.00	$61.00

RENTAL CREDIT/PURCHASE PLANS AVAILABLE
MAINTENANCE PLANS ALSO AVAILABLE

Hazeltine Terminals

MODEL	PUR. PRICE
1410	$ 680
1420	$ 775
1500	$ 890
1510	$ 920
1520	$1125
1552	$1025

Newcorp Products, Inc

45 Commerce Drive/Aston, PA 19014
(215) 485-8180 / 1-800-345-8278

UNH Enrolls DBMS To Perform Applications

DURHAM, N.H. — End-user departments at the University of New Hampshire (UNH) here now do a large measure of application work themselves thanks to a data base management system (DBMS) package installed recently.

System 1022 from Software House, of Cambridge, Mass., has helped speed development of applications while, at the same time, freeing the school's computer center staff for other work.

The package is being run on a dual Digital Equipment Corp. Decsystem 10 — two KL-10s — devoted to the academic, research and administrative needs of the 10,500-student university.

Between them, the two systems have over 1.5 million words of memory, 18 disk drives, seven tape units and a host of other peripherals including more than 200 terminals that provide online access to users at various campus sites as well as at two other colleges. The administrative system alone hosts 75 terminals and 400 users, with 50 jobs being handled at any one time.

The Codasyl-compatible DBMS was installed after an evaluation showed it was "faster and more flexible than other DBMS packages we evaluated," UNH Computer Systems Director Carl Hamrin said.

"It let us add new data without disturbing production. With another system, we would have to unload, refigure our schema, reload and then, in many cases, modify current production programs which access the data base."

Other facets of the data base package also have proved extremely attractive. Simple coding and ease of modification makes application development much faster. In addition, designers and users are able to browse through files, he said.

Conversion Effort

According to Hamrin, not only will new application development employ System 1022, but conversion of other major systems is under way. New applications recently developed using the package include central purchasing and bookstore operations, dining hall management (including meal planning and purchasing), traffic administration (including vehicle registration, permits and tickets) and a public television application which will keep track of sponsors, auction proceeds and donations.

Hamrin credits System 1022 with making efficient the integration of the student record, personnel and alumni operations. "Again, the key advantage is file independence," Hamrin said. "We can link new applications to the biographic data base without affecting current applications."

UNH sees this integration as significantly facilitating file maintenance by eliminating duplicate information and redundant data entry. At least one area to benefit from clean files will be mailings where even a 10% reduction in duplication could save 4,000 to 5,000 pieces in each promotion or fundraising effort.

On the academic side, the Decsystem-10 and System 1022 are used for a wide range of research activities, frequently for statistical sampling in conjunction with the System 1022 SPSS statistical interface. In addition, System 1022 is one of the primary data base concepts discussed in computer science courses.

Seminars Set On Two Coasts

NEWTON, Mass. — The Institute for Advanced Professional Studies and the Polytechnic Institute of New York will present a series of two- to five-day seminars in the Boston area and one in Palo Alto, Calif.

The first seminar, "Pascal Programming for Mini and Microcomputers," will be held July 28 to Aug. 1 in Lexington, Mass., and Sept. 22-26 in Woburn, Mass., at a cost of $750 per attendee. A two-day workshop for engineers, programmers and technical managers called "Ada Introduction and Trends" will be held in Lexington Sept. 25-26 for a cost of $300.

"Designing for Testability," a seminar aimed at test engineers and managers, will be held Oct. 1-3 in Palo Alto and again Oct. 20-22 in Wakefield, Mass. Cost is $450. From Oct. 6-8 in Lexington, Mass., "Managing Technical Programs and Projects: An Advanced Seminar" will be held, with tuition set at $450.

"Diagnostic Software: Planning and Design" will be presented in Wakefield Mass., Oct.23-25 at a costs of $450 to attendees. All prices include course notes, lunches and evening reception with the faculty. Further information is available from the Institute for Advanced Professional Studies, One Gateway Center, Newton, Mass. 02158.

ICCA Chapter Meets

CHICAGO — The local chapter of the Independent Computer Consultants Association (ICCA) recently held its first meeting here.

Formed to promote professionalism among computer consultants, the group reportedly offers the general business community information about computer-related producst and services.

The next Chicago chapter meeting will be held Sept. 23, the organization said.

Course to Focus On Human Resources

ANN ARBOR, Mich. — A two-day seminar focusing on human resource planning for information processing managers and others is being presented by Comshare, Inc.

The seminar will feature Richard B. Frantzreb, a specialist in human resource planning, and will be held in Philadelphia, Sept. 8-9; Chicago, Oct. 6-7; and Houston, Nov. 10-11.

State-of-the-art approaches to human resource planning, and key issues, goals and objectives and creative problem solving will be studied.

The seminar fee is $495. More information can be obtained from Linda LaBarre, Comshare manager of product marketing, P.O. Box 1588, 3001 S. State St., Ann Arbor, Mich. 48106.

Beyond Measuring Lines of Code

New Gauges of Programmer Productivity Set

By Marcia Blumenthal
CW Staff

BOSTON — While agreeing that programmer productivity is one of their most vexing problems, few management information services (MIS) managers have progressed beyond using lines of code to measure productivity.

But the problem with lines of code measures are that they penalize the use of high-level languages for both quality and productivity measures in exact relationship to the level of the language, according to Capers Jones, assistant director of programming measurement at ITT's Programming Technology Center.

The higher the level language, the worse the productivity penalty, Jones told a group of MIS professionals at a recent meeting of the New England Productivity Exchange Round table here, a group recently formed to address productivity issues [CW, June 16].

Reevaluation Urged

Jones, who has published about 30 articles on the topics of productivity, offered comments on current productivity measures and advocated these professionals start re-evaluating their productivity techniques.

In particular, he stressed the importance of paying more attention to the design and analysis stages of program development and measuring the benefit user departments obtain from the software.

Hypothetical Case

Using a hypothetical example, Jones illustrated the paradox between lines of code produced per month and the level of the application language.

For example, a program written in basic assembler language with 10,000 lines of source code could take 22 months to produce and yield 455 lines of code per month.

However, developing the same program in PL/I with 2,500 lines of code in 12 months produces only 208 lines of code, while a 1,000-line APL program would yield only 111 lines of code per month but takes only nine months to produce.

Likewise, other commonly used software metrics are paradoxical and misleading, he claimed. "Cost per defect" measures tend to penalize high-quality products and "cost per page" measures penalize succinctness.

Moreover, there are at least 15 different ways of defining lines of code and varying line counting rules. Depending on the rules, the same program could be 1,000 or a million lines, he pointed out.

"Unless line counting rules are defined and published, information based on lines of code is worthless," he concluded.

In addition, software projects have work that is not related to coding such as design documentation, which change independently of the number of lines of code written.

Error-Prone Modules

One of the thorniest and most expensive issues in program productivity is error-prone program modules, Jones noted. As a rule of thumb, 50% of all errors in a large system will be found in 5% of the modules, while as many as 60% of modules within a program may approach zero-defect status.

For example, in the IBM OS/360, 4% of the system modules contained 38% of the errors, according to Jones, who worked at IBM for about eight years before joining ITT.

Six key factors lead to error-prone modules, he maintained. Individual human variance accounts for a portion of errors; eight programmers given the same specifications produce code that varies by a 10-to-one error rate, he said.

Design and Testing

Interaction of design and testing create problems; some error-prone modules are never formally tested because they are coded without specifications.

In addition, last-minute changes in hard-to-alter software and revisions without reviewing the update complicate matters further. The size of the program module also creates difficulty.

Modules with more than 500 lines of source code tend to be more error-prone, with 50 lines appearing to be the optimal size, he said.

Moreover, the complexity of the code in terms of the number of operator and operands create chances of errors in a module.

One of ITT's major current productivity projects is eliminating error-prone modules in both its old and new programs. In the design of the new products, ITT is looking for "hot spots" during the design phase and giving these sensitive areas extra tests and inspections.

Although not yet widely used, Jones noted two methods of measuring productivity across languages are increasingly attracting attention — Halstead metrics and functions metrics.

Instead of lines of code, Halstead metrics, now widely experimeted with at universities, counts the number of action statements (operators) and data elements (operands) in a program.

Experimentation has found there is a correlation between the sum of the number of operators and operands in the error rate and productivity of a program. Larger companies, such as IBM and ITT, are experimenting with this method.

Function metrics, also under study by IBM, attempts to quantify the cost per function rather than lines of code and assign a benefit to the function.

OUR RS232 MINI FLOPPY CAPACITY & CAPABILITY WENT UP... but not our price!

The best mini floppy store & edit terminals just got better...but it won't cost you a penny more. Now these RS232 compatible units give your terminal even more storage and capability.

102K storage standard—DataMate II & MiniMate II store up to 1280 addressable records of 128 characters.

128K optional—Both units offer double the storage capacity—the most available—for just a little bit more.

Editing—DataMate II adds powerful, easy-to-use editing capability to dumb terminals. MiniMate II has editing features that compliment smart terminals.

Global search & replace plus additional search modes are provided with DataMate II. A search mode is also offered with MiniMate II.

Store & forward—Both communicate in batch or line-at-a-time mode from 110 to 9600 baud and feature auto line feed, interrupt and auto answer modes.

12-Month warranty—another WTI first. Why settle for less?

Call or write for more information today.

wti western telematic inc.
2435 anne st., santa ana, ca. 92704 • (714) 979-0363

ROPES ™
ON LINE PRINTING UNDER CICS

ROPES™ —features:
- CICS and batch report generation
- Special forms processing
- CICS printers with the flexibility and control of HASP, POWER & JES printers
- Macro and Command Level support for batch & online COBOL, PL/I and Assembler
- Low overhead through effective modular design and efficient use of CICS and Operating System resources
- ANSI carriage control interpretation and page overflow processing for CICS printers
- Complete user documentation
- Reliability across system and printer network outages
- User installation
- No modification to CICS

For FREE information, contact:

Axios Products, Inc.
2364 Middle Country Road
Centereach, New York 11720
Phone # (516) 588-5461

DSM GIVES YOU A LITTLE BIT MORE.

No wonder everyone's talking. DSM has hardware and software backed by fast delivery and a knowledgeable sales staff. So do a friend a favor and pass the word.

DATA SYSTEMS MARKETING
Your Hardware/Software Distribution Centers

San Diego 714/560-[illegible], Orange County 714/[illegible], Los Angeles 213/641-2050, East Los Angeles 213/794-5257, Mountain View 415/941-0240, Englewood (Colorado) 303/770-1972, Denver 303/573-5133, Colorado Springs 303/471-1563, Salt Lake City 801/487-8261, Albuquerque 505/292-2911, Phoenix 602/833-0081, Seattle 206/487-3571, Portland 503/640-4883, Norman (Oklahoma) 405/364-9803, Pittsburgh 412/486-2676, Bend (Oregon) 503/389-3612, Dallas 214/243-0812, Main DSM Warehouse 800/538-5717 (California only) or 609/854-2684.

First Place in Accounts Receivable

TI's DS990/2 Scores High in Benchmark Tests

By Hillel Segal

Texas Instruments, Inc.'s DS990 Model 2 small business computer showed an above-average performance in the Association of Computer Users benchmark testing series for computers priced $15,000 to $25,000. TI's second entry in the 12-system field, the DS990/2, gave results comparable to those of the similarly priced FS990/10, tested earlier.

The DS990/2 came in first in the accounts receivable problem and placed second in the editing test. In other tests it ranked about midway in the group.

One test, the scientific/engineering problem, could not be run because of memory space limitations, a problem also encountered on the FS990/10. All tests were performed in Basic, the language used for this study in all systems where it was offered.

Its first-place finish in the accounts receivable problem was the highlight of the DS990/2's benchmarking runs. Since the system was designed for business use, this test result is a good indication the TI engineers have succeeded in getting the balance of capabilities needed for running a business application quickly.

The accounts receivable problem involves handling a file of 50 account records. Each record has 10 fields for items such as customer number, salesman number, year-to-date sales, month-by-month sales for five months, payments, and credit limit.

During the running of the problem, the sales amounts and payments fields are updated 10 times by customer number. Then a report is displayed on the system CRT terminal, containing billing detail with the company, salesman, year-to-date sales, credit limit, amount outstanding and sales by month.

The TI DS990/2 required 2 minutes 48.3 seconds to run the problem. Others tested in the series took as long as 10:37 to perform and display the same set of functions.

Memory Squeeze

The memory limitation occurred because the TX5 operating system together with TX5 Basic language requires all but 14.5K bytes of the 64K total memory area. This left insufficient room for the scientific/engineering problem to be run.

A scaled-down version of the problem, test C-1A with 35 simultaneous equations containing 35 unknowns (vs. 50 for C-1), was able to be run on the DS990/2. Performed only on the latter six systems of the benchmark field, this test allowed some estimate of real-life scientific problem-solving capabilities. The DS990/2 ran fourth in this smaller six-system field.

The memory space squeeze which prevented the scientific/engineering problem from running was being approached in several ways by users and TI. The independent consulting firm whch performed the benchmark tests tried TI's Power Basic on the similar FS990/10 system, and it allowed the test to run in 6:31, the equivalent of a fourth-place effort.

(Incidentally, we also ran the scientific/engineering test on the FS990/10 using TI's Fortran IV in a time of 1:02, twice as fast as any system tested in Basic during the entire series. It is easy to see from this statistic alone why Fortran is popular among scientific users.)

The smaller, nonupgradable DS990/1 systems are outfitted with a different version of Basic called small business computer or SBC Basic. This version uses an operating system which takes up significantly less memory space, leaving 26K for the user out of a 64K total memory area.

The Model 1 can use all the same languages as the rest of the DS990 family, including Basic, Fortran IV, Assembly and run-time systems for Pascal and Cobol. However, the Model 1 uses different hardware which cannot be expanded as easily as the Model 2.

With an upgraded processor, including an additional 64K bytes of memory, the Model 2 can be transformed into a Model 4, solving the memory limitation in the most obvious way: add more memory.

OEM Responses

OEMs contacted during the user survey portion of the benchmarking process indicated that the 64K memory limitation of the Model 2 occasionally caused them to simplify or structure their programs differently. But it was considered an acceptable arrangement for a "target" system, that is, a small computer on which could be run applications programs written and developed on a larger computer.

One user commented, "I have some programming problems because of the high system overhead." "I've gotten used to writing small programs," said one, who added that he also partitions programs to get around the space problem. Another noted the run-only mode allows more memory to the user than the development mode.

The larger systems in the DS990 family, the Model 4, 6, and 8, were being used for development work by OEMs contacted. And it was interesting to note that in contrast to the scientific application-oriented FS990 series, all user respondents to this survey were interested in the DS990 for business applications only.

Compatible Software

Compatible software throughout the DS series was considered a big advantage to users of the line. The Basic used for the FS990 tests was also virtually identical to that needed for the DS990. Only a minor change in I/O statements to address the diskette drives was needed.

"The flexible language offerings and compatibility between systems are really 'plus' factors," one user noted. "I like the fact that the Model 2 software is compatible with the larger DS systems," another said.

The Model 2 offers users an entry into the DS990 family of systems. On the low end of the series, it offers a limited multiuser capability and can be expanded with hard disk drives by adding a DS10 Disk unit with 4.7M bytes of fixed disk and a like amount of removable disk. Reel-to-reel tape is also offered, and up to four floppy diskettes can be utilized.

Nowadays, the company markets the TX5 operating system package separately for $1,700, and a comparably priced DX5 operating system and utilities are also available for users who prefer to run in Cobol on a Model 2 while developing their programs on a Model 4 or larger system.

The price of $18,740 for the DS990/2 includes the 64K processor and memory, a video display terminal, Model 810 printer, TX5 operating system, utilities and the Basic language. Two diskette drives totaling 2.3M bytes were also included in the configuration tested.

The system editor of the DS990/2 was found to have the second-best performance of the 12 systems tested in this price range. It required 155 keystrokes to edit the nine-line sequence according to the script and was rated very easy to use.

Since the DS990/2 was introduced to the OEMs late last year, end-user comments on this model were not as available as for those systems which have been offered longer. However, Texas Instruments itself received favorable comments from end users and OEMs alike, who said the company offered good engineering at a reasonable price.

For end users in the business fields especially, however, the relationship with the OEM supplying the hardware and software would be a critical element in the success of the installation.

Next week: a roundup review of all 12 systems tested in the $15,000 to $25,000 price range.

SCOREBOX

System: Texas Instruments DS990/2
Current Price: $18,740

BENCHMARK RESULTS

		TIME	RANKING
C-1	Scientific/-Engineering Problem	*	*
C-3	Accounts Receivable	2:48.3	1st

OTHER BENCHMARK RESULTS

	C-1	C-3
IBM 5110	8th	4th
Wang 2200VP	1st	3rd
Texas Instruments FS990/10	*	2nd
Hewlett-Packard System 45	3rd	8th
DEC PDP-11V03	7th	5th
Q1 Lite Microcomputer System	4th	7th
Univac BC/7 Model 610	5th	11th
Northern Telecom 405	*	**
Datapoint 1170	9th	9th
Randal 100	6th	10th
Hewlett-Packard 250	2nd	6th
Texas Instruments DS990/2	*	1st

*Test could not be run because of memory limitations.
**Test could not be run because of memory or formatting limitations.

This weekly column gives the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

About the Author

Hillel Segal is president of the Association of Computer Users (ACU), a nonprofit association with members all over the U.S., Canada and several other foreign countries.

One of the association's key activities is the publication of its "Benchmark Reports." Each month a new report is produced covering another computer system.

In addition, ACU publishes seven bimonthly newsletters for users of small computers, midi computers, large computers, time-sharing systems, distributed processing systems, word processing systems and home and hobbyist computers.

A complete set of sample copies of each of ACU's newsletters and complete information about membership in ACU are available from the ACU at P.O. Box 9003, Boulder, Colo. 80301.

Programming a Logical First Step?

Turnaround Time
By Larry E. Long

Q In my company you are either a programmer or a systems analyst. Each group has a manager, both of equal rank.

All new employees in management information services spend three to five years as programmers before they are "promoted" to the systems group. I think I would enjoy systems analysis and design, but I'm not cut out to be a programmer.

Is programming experience really a requirement to be a good systems analyst? If so, how much is needed?

A First, I would like to dispel the myth that the logical upgrade from a programming position is to a systems analyst position. Both are professional DP positions. Your company apparently encourages this career path and probably has systems analysts who would be better contributors as programmers and vice versa.

I've been asked this question many time and consequently have given considerable thought to a response. Though many will disagree, I would encourage people entering the data processing/information systems profession to develop at least intermediate skills in business programming. Depending on an individual's exposure to programming in college, this may take from six months to two years.

This exposure will instill an empathy for the plight of the programmer and provide background knowledge in the realities of hardware/software capabilities and limitations. These are necessary ingredients for a "good" systems analyst.

Q We are a small combination export-management firm and have been interested in setting up part of our order process and record keeping on a computer. As our business is rather specialized, we have been unable to locate software designed for our type of operation.

Hardware dealers have quoted us a variety of equipment ranging in price from Radio Shack's TRS through IBM, Wang Laboratories, Inc. and so on (prices from approximately $8,000 through $35,000). Estimated software costs from different vendors ($5,000 to $30,000) were such that we are afraid to get started.

Our sales volume, while small, should be in the area of $3,000,000 with some 500 to 700 orders to be computerized. Have you any suggestions?

A I recognize that establishing a DP department in your company will require a significant commitment of funds, both now and in the future. What's more, I can almost guarantee you some very anxious moments, and even months, during the development stages and after implementation. Managers from other small companies have experienced the same reservations as you.

Although the range of hardware and software price quotations may seem extraordinary, they're not. Unfortunately, I cannot be definitive about which computer to select, nor can I say that there is a direct correlation between quality and the price of software services, because there isn't. You may need expert assistance from someone who is familiar with your environment.

If you're like virtually all other initial computer users, you can expect rapid, cost-effective growth. With this in mind, you need to ensure that the computer system you purchase can be expanded to meet your needs and that the software is flexible enough to accomodate interaction with future applications systems.

This expected growth is going to require ongoing attention. For this reason, I would suggest that you consider either hiring someone to handle the DP activities, hopefully with previous experience, or cross-train an existing employee. You might consider either of these approaches as an alternative to having your initial software developed by software vendors.

Initially, the software decision may be more critical than the hardware decision. Therefore, if you elect to go with a software vendor, define the expected software deliverables in writing (programs, program and system documentation, user manual, training, scope of conversion and implementation effort, extent of changes after post-implementation review and so on).

One more point. Many small companies have tried and failed to successfully implement DP systems. Most of these failures can be traced to management's reluctance to be active participants in the development process and their lack of patience to wait for the completion of a quality product.

Long is a professor at Lehigh University, a DP consultant and author.

Have a question? Send it to Larry Long, Editorial Department, Computerworld, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

Our new display terminal has a great supporting cast.

The AJ 510 display terminal with AJ 460 Micro Diskette System, AJ 832/RO receive-only printer, and AJ 1234 acoustic data coupler/modem.

The AJ 510, the most versatile CRT terminal in its class, excels at interactive timesharing and a lot of other jobs. And with the addition of these supporting AJ products, you can greatly expand your application flexibility.

Start with the AJ 510

As a stand-alone device, the AJ 510 is ideal for jobs such as data entry, text editing, order entry, and graphics. It includes such features as ASCII, Graphics, and optional APL character sets; a bright 15-inch screen; 16 video enhancements; editing capability; a format mode with protected fields; and communications rates up to 9600 bps.

Now add data storage

For convenient, low-cost data storage and retrieval, the AJ 460 Micro Diskette System offers you local data manipulation and high-speed on-line communications. Combined with the AJ 510, the AJ 460 helps you reduce telephone charges and computer connect time, while further increasing application flexibility.

And top quality printing

Connect an AJ 832/RO receive-only printer and you get letter-quality hard copy output. Features include selectable data rates up to 45 cps, dual pitch selection, vertical forms control, and more—even interchangeable "daisy" wheel printing elements so you can customize the type face to the application. Now you have a system that's ideal for form letters, contracts, and camera-ready art of all kinds.

And communications

Finally, from the wide range of AJ couplers and modems, select the one that best fits your application. The AJ 1234 coupler/modem, for example, lets you take advantage of full duplex 1200 bps communications over dial-up or two-wire leased lines.

The final act

We not only build all this equipment, we also lease, sell, and service it. We'll take care of it throughout its lifetime. Which makes life easier for you.

So whether you need a stand-alone terminal or one with a strong supporting cast, AJ has the answer. Get in touch with the AJ regional office nearest you: San Jose (408) 946-2900; Chicago (312) 671-7155; Hackensack (201) 488-2525. Or write Anderson Jacobson, Inc., 521 Charcot Avenue, San Jose, California 95131.

Also available through AJ subsidiaries in Ottawa, Ontario; Paris, France; Shepperton, Middlesex, U.K.; and distributors throughout Europe.

ANDERSON JACOBSON

Datapro Reports

They don't cost, they pay

"Perhaps the most valuable investment an information processing professional can make..."

Making decisions about information processing without Datapro just doesn't compute. The 80s are here—with unprecedented opportunities to gain efficiency and profits through automation—and the choices get broader and more challenging everyday. Datapro reports are the recognized EDP/Office Automation "bible" for systems planning, equipment selection, current awareness and results-oriented management advice. That's why *every month nearly 4,000* information processing professionals *become new subscribers* to one or more of our information services. Shouldn't you?

Here are a few of the benefits that make a Datapro subscription so important:

- Eliminate costly mistakes in product selection
- Control costs by improving fit of products to specific needs
- Cost-optimize EDP and office functions
- Out-pace the competition by keeping in touch with industry trends
- Aid system planning by surer selection of components
- Increase current awareness

Here are a few of the features that make Datapro information so valuable:

- Independent Product Evaluations
- Detailed Comparison Charts
- Current, Comprehensive Pricing Data
- Photographic Coverage
- Management Level Presentations
- Reports Cross-Referenced
- Users Ratings of Products
- Directory of Suppliers
- Continual Monthly Updating
- Product Perspective and History
- Highlights of Product Operation

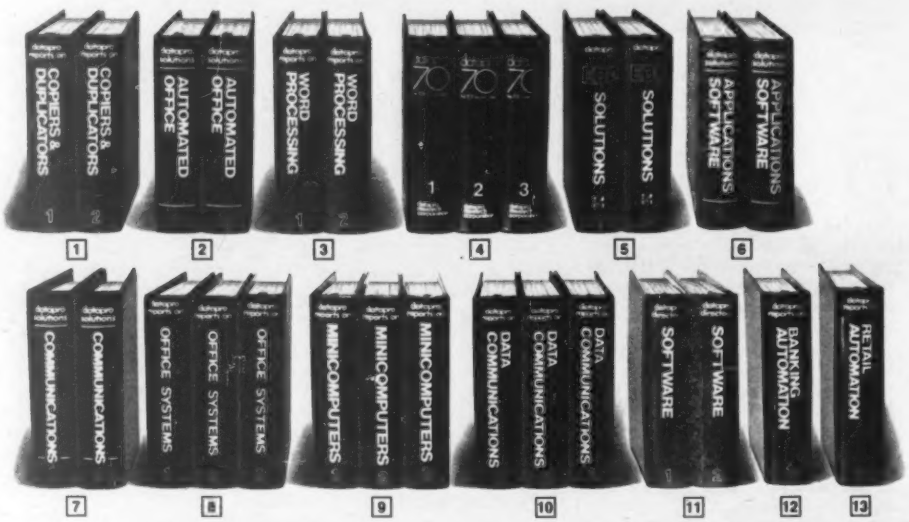
Here are just a few of the areas where thousands of users are putting Datapro's services to effective use:

- EDP Operations
- Management Information Systems
- Corporate Planning
- Systems and Procedures
- Research and Development
- Purchasing
- Data/Voice Communications
- Engineering
- Accounting
- Administration
- Marketing
- Manufacturing
- Competitive Analysis
- Market Research
- Product Planning

The EDP Buyers Bible since 1970

You can select

just the reports you need. To help you make better EDP/Office Automation decisions. To reduce your EDP and office costs and avoid far-reaching mistakes. They provide the timely, reliable, and unbiased information necessary to improve your product selection and usage, operations system planning, competitive analysis, current awareness . . . and much more.



1 Copiers and Duplicators
2 Automated Office Solutions
3 Word Processing
4 Datapro 70: The EDP Buyers Bible
5 EDP Solutions
6 Applications Software Solutions
7 Communications Solutions
8 Office Systems
9 Minicomputers
10 Data Communications
11 Directory of Software
12 Banking Automation
13 Retail Automation

30-day trial

Here's how to make Datapro Reports pay. You can have your choice of these thirteen Datapro Information Services to use in your office for 30 days, with *no purchase obligation*. Use them to investigate and evaluate thousands of new products, compare costs, performance, user ratings, specs, competition, and more. See for yourself why nearly 4000 new subscribers try Datapro every month. Complete and return this coupon today for full details.

☐ Yes, I'm interested in reviewing the information service(s) checked below. Please send me information, without delay, about Datapro's 30-day no purchase obligation trial subscriptions plan.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

Phone _____ Zip _____

CW 7/28

datapro

DATAPRO RESEARCH CORP.
1805 Underwood Blvd.
Delran, NJ 08075 • (609) 764-0100

IN DEPTH

MAINTENANCE PROGRAMMING

By David M. Clark

Maintenance programming is an important but often overlooked facet of most DP organizations. Shunned by programmers who consider themselves the Leonardo Da Vincis of their shop and ignored by many high-level managers who want to know why their favorite project has not gotten off the ground, it remains the frequent burden of those least qualified to perform it: trainees and programmers new to their shop.

The larger, more complex systems that users are currently demanding require detailed knowledge of a system

With maintenance consuming up to 80% of software costs, it's obvious that paying attention to the black box of maintenance programming could pay big dividends for programming managers.

in order to effect even the smallest change without disruption. Yet the high degree of turnover in many shops, plus the requirement to rotate creative, easily bored people through a variety of programming challenges, often necessitates that programmers make changes to a system about which they know little.

Furthermore, with software costs climbing and maintenance consuming as much as 80% of those costs, it becomes obvious that paying increased attention to the black box of maintenance programming could pay big dividends for programming managers. Programming aids, high-level languages and easy-to-use file and debugging utilities help, but there is another side to the story: a formal methodology in how to make changes to an existing program.

Determining how to go about changing a program is one of the biggest headaches inexperienced maintenance programmers have. Typically, they spend too much time on frustrating, misdirected (and expensive) searches for the right code to change. Sometimes they get lost in the wrong section of the forest, sometimes they spend too much time looking at too many of the wrong trees and sometimes they want to chop down the entire forest. In other words, they need help seeing the forest for the trees.

It is a truism of programming that it takes more time to find where to change a program than to make the change. Consequently, the methodology discussed below emphasizes the proper preparation for making a change and not the specific change itself. It is easy to write a MOVE statement in Cobol, but harder to know where to put that MOVE statement.

This methodology should also help experienced programmers and can be applied to nearly all systems. While it is primarily intended as a working tool for the practicing programmer, management will also find it helpful as a checklist against which to measure maintenance training.

Importance of the Task

The first step is to determine approximately how long the task should take and how important it is. While all of your tasks are probably considered important by management, it is important to be able to estimate how much time and effort the task requires. If management does not give you a rough estimate of the time it should take you to complete the task, or if your estimate (assuming you feel confident in making one) is way out of line with management's, ask for clarification.

The time estimate is important to management because it indicates the upper limits of the cost/benefit ratio, that is, if it takes you significantly longer than the estimate to complete the task, management may decide that the cost of completing the task may be exceeding the benefits. The task might be given lower priority, completed by someone else more knowledgeable about the system or perhaps not performed at all. If your net hourly cost in changing a program exceeds the benefit derived from the change, you may be a victim of poor planning or time estimating, but you may also be spending more time than you should on the task.

You should also determine for yourself how important this task is to your work load. To do this, ask the following questions:

1. Have you been given too little or too much help in determining how you should go about making this change? If you have been given too much help, that is, another programmer led you right to the code to change and pretty much told you how to change it, you should ask yourself why. That type of approach is costing management more than if the other person completed the task himself and may indicate a lack of trust in your sleuthing ability. Conversely, too little time spent explaining the task may indicate that the task is a vote of confidence in your abilities, however frustrating that may be.

2. Have you been assigned permanent responsibility for maintaining this program? If so, a little extra time spent familiarizing yourself with the entire program will pay dividends later.

3. How much time do you have for testing? If you are in a shop in which you can only get one test run a day, you obviously want to make that one run count and spend more time in analyzing and desk-checking the required changes.

4. How difficult is it to test the program? Can you try out several different changes quickly and easily, or should you spend more time checking the changes? Determine for yourself the optimum testing/desk-checking ratio.

Change Instructions

Paying careful attention to the change instructions is an obvious yet often-overlooked step.

Hopefully the instructions will be in writing, which at least will afford you the opportunity to read and study them. However, this may still not be enough, and you should determine, through direct contact with the user who first requested the change, if the instructions really communicate what the user wants. Although volumes could be written on user/DP communications, keep in mind this simple fact: Most user-related problems in DP are not technical problems, but communication problems.

For example, a user requested two changes to a program that produced a report very similar to another, more frequently used report. As it turned out, there had been other, more recent changes made to the second report. In discussing the changes with the user, we discovered that he really wanted the two reports to correspond exactly. So instead of having to hunt and peck to make the original two changes, we

(Continued on Page 28)

IN DEPTH

(Continued from Page 27)
simply inserted in the first program all the changes made in the last couple of months to the second, more frequently used program.

The task thus became logically easier to accomplish (since we didn't have to determine where the two programs were different), it took only slightly longer to do and the user was happier. And isn't that what we are in business for?

Get an overview of the program before you start. The length of time you spend on this overview will depend upon how much importance you have assigned to the task, as mentioned earlier. However, you should at least determine the following:

1. What is the basic purpose of this program? Is it a report generator, a file update, an edit/update?

2. What is the primary output of the program? If you know what the program is working towards, it becomes easier to understand intermediate calculations or processing.

3. What is the basic framework of the program? How are loops handled? What type of organization does the program have — formally structured, loosely structured (GOTOs allowed, within limits) or "waterfall" (GOTOs cascading down through the program)?

In addition, try to determine the style of the programmer who originally wrote the program. Most programmers have styles of coding as individual as their handwriting. Understanding how their code loops in one part of the program will probably help you understand how loops are coded in a more difficult section of code. Look for patterns in such things as how data names are formed, how IF conditions are handled (positive or negative logic) and so forth.

Answering these questions will help you make intelligent guesses about what the program will do when you finally come to the section that you need to change. That in turn will help you decide more quickly, and with more assurance, what will happen if you change program control statements and thus program logic.

Getting an overview is usually easier with a program that has some structure (that is, it falls somewhere along the continuum from modularized to formally structured). However, if you become hopelessly lost in a program with countless, hard-to-follow GOTOs, than perhaps the best approach, to paraphrase Alice in Wonderland, is to begin your overview at the beginning. Identify the major I/O areas, and then start with the first procedural statement, following the guidelines discussed herein.

Look for the Loops

Assuming that you know how much time and imporatance you want to attach to this task and that you have some idea of what you and the program are both trying to accomplish, the next step is to stake out the major boundaries of the program logic. To do that, break the program down into its identifiable segments (mainline code, initialization routines, and so forth) in order to determine into which segment your change will fall.

The easiest way to do this is to look for the major processing loops in a program, since they serve as fence posts of logic. Almost every program has them, even if they are implied (PERFORM UNTIL or DO WHILE). The main loops are usually marked, especially in an unstructured program, by some sort of input statement, usually a read, and a program control statement such as a GOTO.

Pay particular attention to unconditional branches. For example, look for GOTOs before paragraph or section names in Cobol, especially GOTOs that loop back to the main input paragraph.

Picking out the major loops in a previously unfamiliar program also has a tremendous psychological advantage: It reassures the programmer that there is, in fact, some way to understand and therefore change a complex program. This advantage is not to be taken lightly, since it is often out of frustration over a seemingly incomprehensible program that programmers make careless, stab-in-the-dark changes. These are the very changes that return to haunt their successors in the form of system crashes, missing input and so forth. We then have the famous vicious circle in which programmers do not have enough time to write correct,

The small computer breakthrough.

Burroughs new B 90s combine the most advanced computer hardware, operating software and application programs in a powerful, easy-to-use package. All at a minicomputer price.

Introducing Burroughs B 90 Series. The system that brings together the best of what a small computer can offer your business today:

High-speed processing power. B 90 processors operate at two to five times the speed of Burroughs previous small computers.

Expanded main memory. Up to 512,000 bytes of main memory, four times previous memory capacity.

Extensive data storage capacity. The B 90s utilize Burroughs new Super Mini-Disk II, a breakthrough in magnetics engineering. This dual flexible disk system stores up to six million bytes. Three times the maximum industry capacity per disk. Other disk options provide total storage up to 46.6 million bytes.

And there's more. Expanded data communications. Multiple work station capability. Advanced automatic operating and control system software. And true multiprogramming capability. Adding up to powerful workflow, in stand-alone applications or in a distributed processing network.

Most important, the B 90s are easy to use. Operating software manages the systems' resources and, via display screen, guides the operator every step of the way.

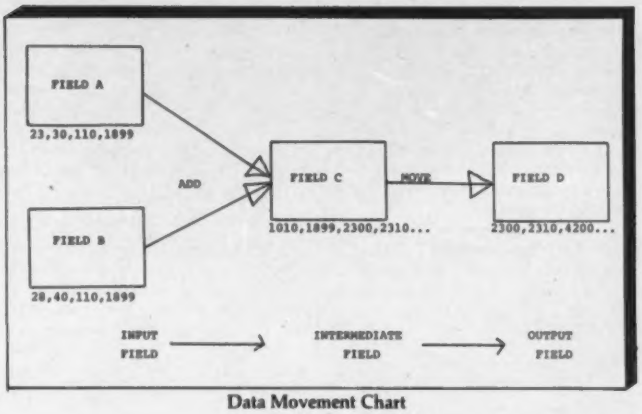
More good news: B 90 prices start at less than $18,000. Add Burroughs proven application programs — available for all major lines of business — and your B 90 is ready to go to work, instantly.

And remember, every Burroughs system fulfills the need that counts most in your business: increased productivity. Burroughs has understood this for over 90 years.

That's why we provide total capability in information management. Computers, word processing systems, facsimile communications, system software, application programs, customer training, maintenance, plus business forms and supplies. We call it Total System Support. And it's there to help you improve your productivity.

For additional information, call your local Burroughs office or write Burroughs Corporation, Department CW-22, Burroughs Place, Detroit, Michigan 48232.

Burroughs



Data Movement Chart

easy-to-maintain programs because they are too busy "putting out the fires" of someone else's previous mistakes.

Ignore Extraneous Sections

Ignore the parts of the program that will not be affected by your change. This is one of the most important yet most difficult steps in maintenance programming, yet it is precisely because programmers jump right to this step that they have so much trouble.

Performing the steps discussed above makes the task of weeding out the inapplicable parts of the progam fairly simple. With an overview of the program in mind, and knowing the style of the original programmer, you can then determine where the main line section of the program falls, where initialization is performed, when the program is likely to loop, why and, in general, focus on the general area of the change. Your familiarity with the change instructions will then enable you to make your change more quickly and confidently than you would have otherwise.

It is also possible to give some general guidelines as to which areas of a program can be ignored, at least on the first go around. For example, initialization sections are usually only important later, when you need to know when and where a key data field is first accessed. Sections that build tables internally are only important when you are changing the layout of those tables. Otherwise, concentrate on what is done after data is stored on those tables. In a file update program, you can ignore the key matching logic if you are only interested in the output on one of those files.

When All Else Fails

If the program you are staring at has the clarity and organization of a pile of spaghetti, then the best thing to do may be to begin at the end of the program and work backwards through the program logic. That is, if you know what fields on a file or what columns on a report you want to change, start with the data names for those fields and find out where those data names are accessed in the program cross-reference dictionary.

A data movement chart may help (see figure). Starting at the right-hand side of a piece of paper, draw a box with the last output field name in it. Below the box, draw the lines in the program in which that field appears. You then check each occurrence of the field, crossing out any superfluous accesses of that field and concentrating on those lines in which the field is created or otherwise manipulated.

Any fields that provide data for that output field are drawn to the left of the field, in their own box, with arrows showing the direction of the data movement connecting the two boxes. The statements that modify or create the data can be written over those arrows.

This process of working backwards through each field is continued until the original source of the data, or the field that needs to be changed, is encountered. Finally, the data movement chart can be filed with the change instructions for subsequent use by later programmers.

Don't go overboard with your changes, but don't be afraid to make a change.

This hardly bears repeating, for most of us learned early in our careers that changing something you didn't have to change because it wasn't done with sufficient elegance can lead to sudden and disastrous results. But what does bear repeating is that "once burned, twice shy" is not necessarily effective programming. People write code, and people can change code — it is not cast in stone.

Conversely, consider using code that you are reasonably confident already works. (Not all existing code works, but give it the benefit of the doubt if you are not sure.) Perhaps there is another similar routine in an existing program that can be copied or modified for use in your program.

At this point, you also might want to consider what other changes the user might want to make in the near future that you could make while the program logic is fresh in your mind.

One of the best additions or corrections you can make to a program is to document what you have learned about the program logic. For example, a few words inserted directly into the code about what a switch does, where it is initialized, under what conditions this paragraph is performed and so forth can help those who follow you tremendously. And who knows, you might even start a trend towards greater documentation in your shop!

Document Your Changes

Document your changes at the lowest level possible in the system hierarchy.

Many programmers will understand the need for the steps discussed above, but balk when it comes to documenting program changes. (It is interesting to watch those same programmers making changes to an unfamiliar program. When scanning a page of code, their eyes will usually jump right to any documentation, even if that documentation is totally irrelevant or out of date. Once in place, program documentation is hard to ignore.)

The pros and cons of documentation

(Continued on Page 30)

BEST COST PERFORMANCE 300 LPM PRINTER ON THE MARKET!

80-column 132-column Forms Access

LOCAL DATA QUIET 300™ PLUG COMPATIBLE LINE PRINTERS

- DEC®, CA, DG, Datapoint, Prime, Wang, etc.
- HP-250®, HP-300®, HP-3000® Series 30 & 33
- Serial: RS-232C, 20 ma, X-ON/X-OFF or Busy
- Parallel: Centronics®, Dataproducts® or DEC® LA-180
- HP-IB MPC with VFU
- Teletype Print Mechanism
- National Full-Service Maintenance

WEST (408) 377-7001 (213) 841-1840 (602) 894-1285
MIDWEST (612) 884-0202 (414) 784-3863 (513) 435-2772 (214) 387-2855
EAST (215) 348-7493 (301) 434-1555 (301) 782-0660

LOCAL DATA
2701 TOLEDO ST.
TORRANCE, CA 90503
(213) 539-7126
Telex: 182518, LOCALDATA TRNC

"I'll pay your IBM maintenance bill"

I'm Bob Rich, General Manager of Computer Maintenance and Leasing Corporation.

A few years ago we had an idea that has changed the way a lot of people think about computer maintenance.

The idea is a simple one: you don't have to sign an IBM Maintenance Agreement in order to get IBM service, parts and personnel.

When you purchased your IBM system, you were given a choice of two maintenance plans:

IBM Maintenance Agreement — where you pay a fixed monthly fee for all normal services as needed.
Per Call — where you pay an hourly charge up to $91 plus parts, plus travel, portal to portal.

We at CMLC will provide you with a comparable maintenance agreement for considerably less. You get service from *IBM engineers* using *IBM parts*. But then IBM bills us at the per-call rates.

In other words, you get the security and budgeting control of the IBM Maintenance Agreement, at significant savings, and we promptly pay all the IBM bills.

Furthermore, we offer *increased* services, such as extended hours of maintenance coverage... 11 hours per day, versus 9 hours under the standard IBM Maintenance Agreement... mechanical replacement of "problem" machines and a complete preventive maintenance program.

Sound too good to be true? If you're one of those people who doesn't believe that it's possible to get more for less, call us toll-free at:

1-800-328-3655

(In Minnesota, call 612-473-3608 collect)

We'll give you the names of people in your area who have found that it's more than possible. It's simple.

cmlc
computer maintenance and leasing corporation

1009 Twelve Oaks Center
15500 Wayzata Boulevard
Wayzata, Minnesota 55391

IN DEPTH

(Continued from Page 29)

and how to document effectively lie outside the scope of this article. However, the following simple tips should prove helpful in answering the question most frequently asked when a program has problems: Has it been changed lately?

1. Document at the lowest level possible, which is usually right where you make your changes to the program. Separate documentation folders or program/system narratives are nice (and important, for different reasons), but they are too far removed from the level of the system that changes most frequently. Most programmers go to the code first when they need to change a program; put your documentation there.

2. Put in the code some reference to the task or change instructions. This enables subsequent programmers to quickly spot which code was changed. For example, in our shop, we insert the word "TASK" followed by the four-position task number in column 73-80 of our Cobol source programs. Then if a programmer wants additional information, he can pull the file on that task (they are filed by task number) to gather any additional information, such as the original change request letter from the user, or notes the maintenance programmer may have made in making the change.

3. File the changes to the program with the program source listing. This ties in with Number 2 and provides a ready reference to all previous changes. For example, we file a separate list of just the permanent program changes in front of our Cobol source listings. Then when we have problems with the program, we can tell instantly by looking at the previous program changes if the program has been changed recently.

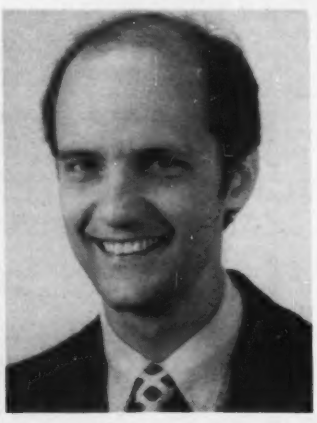
Learn From Other's Mistakes

After a stint doing maintenance, most programmers appreciate the difficulties in changing obscure, hard-to-follow code. (Is this why some companies start their trainees in maintenance programming?) Hopefully, this will lead you to improve your own code by making it easier to follow and easier to change.

However, maintenance programming should also help you appreciate the problems the original programmer had to overcome. Providing DP answers to a user's problem can be difficult; code can be difficult to write. So making a program legible and easy to maintain is an important goal, but not as important as writing programs that work as the user wants them to work. Efficient and easy-to-maintain programs, completed within a reasonable period of time, should be the goal.

Following the steps above should speed the time required to maintain existing programs and thus improve programmer productivity and lower maintenance costs.

This methodology should also turn maintenance programming from an archaic, hit-or-miss approach into a more precise and exact science. Hopefully it will also raise the image of programmers as magicians mumbling mysterious mumbo jumbo into true software engineers practicing a rigorous and effective science.



David M. Clark is a programmer analyst with Reynolds Metals Co., Richmond, Va.

Clark's interests include programming techinques, programmer productivity and the psychology of computer programming.

Clark holds a B.A. in English from Dickinson College and an M.S. in business information systems from Virginia Commonwealth University.

THE PROTECTOR.

Save $27—

The 8"50-File protector (normally $39.95) is now only $12.95 with the purchase of 50 Verbatim diskettes.

Verbatim media stores your data on flawless, dropout-free diskettes (not to mention cartridges and cassettes, too). Now you can get a rugged, attractive file box to store the Verbatim diskettes that hold your data. Don't let dust or scratches dirty your data; don't shuffle on your desk for a missing disk. Get one of our data protectors at a special introductory price. Buy 50 Verbatim 8" diskettes and save $27.00 or buy 50 5¼" minidisks and save $19.00 on one of these brand-new 50-Files. Just one more way that Verbatim goes all out to protect your media.

To find a local distributor call us toll free at (800) 538-1793 (from outside California) or collect at (408) 737-7771 (in California).

Verbatim®

Save $19—

The 5¼"50-File protector (normally $29.95) is now only $10.95 with the purchase of 50 Verbatim minidisks.

Offer limited to stock available.

When everyone is screaming at you about Response Time, get the facts.

With the Tempo* Response Time Monitor

When you're in charge of a large IBM 3277 or 3278 computer network, you can have literally hundreds of people shouting at you about response time at their terminals. When that happens, you need hard data, real information you can rely on to tell you what's actually going on at users' sites. You need a record of response time which is believable to you and your users, a starting point for discussing how to improve the situation.

You need Tempo, the response time monitor from DTSS Incorporated, a subsidiary of Metropolitan Life Insurance Company.

TEMPO IS THE BETTER WAY TO MEASURE RESPONSE TIME:

Tempo gives you:

ALL THE FACTS: Tempo measures the *complete response time cycle,* from terminal to host and back again, and prints the results with the time of day.

IN ALL IBM ENVIRONMENTS: Tempo provides you with all the facts while running under SDLC, Bisync, SNA, and local protocols, using VTAM, TCAM, and BTAM telecommunications access methods.

WITH ALL THESE ADVANTAGES: Tempo is designed to fit right into your existing office environment. It's easy to install and highly reliable, with a quiet printer attached to record data. And it's upgradeable to a model which provides you with the facts at both terminal and host computer sites.

We're so sure you'll appreciate the benefits of converting response time from a matter of opinion to a matter of fact that we are making an unprecedented free trial offer. Simply attach your Purchase Order for $2,450 per unit to the coupon below, send it to our sales manager Bob Early and indicate to us that you want to try out a Tempo unit for FIFTEEN DAYS, free of charge. If, at the end of that time, you are not completely satisfied simply return the unit to us and you pay only for shipping.

*Trademark applied for.

15 DAY FREE TRIAL

Dear Bob:

Yes, I am interested in the Tempo Response Time Monitor!

☐ Please send me _____ unit(s) for my free trial as soon as possible (I have attached a Purchase Order).

☐ Please have a salesman call. ☐ Please send more information.

NAME: _____

TITLE: _____

COMPANY: _____

ADDRESS: _____

_____

TELEPHONE: _____

No. of Terminals Installed: _____ 3277 _____ 3278.

Send to Bob Early, DTSS Incorporated, 10 Allen Street, Hanover, NH 03755. Telephone 603/643-6600.

DTSS

EDITORIAL

Computers and the Draft

What gives the Selective Service System the right to commandeer the computing resources of other federal agencies?

To support draft registration of 19- and 20-year-old males, the Selective Service has drafted more than 1,000 keypunchers, mostly employees of the Internal Revenue Service (IRS), to handle an expected flood of computerized registration forms.

The IRS, a Treasury Department agency, will convert the data to magnetic tape for processing on a National Advanced Systems Corp. AS/5 mainframe owned by the Interior Department (see story on Page 9). Additional support will be rendered by the General Services Administration and the Office of Management and Budget.

This pooling of information processing resources within the federal government should not escape public scrutiny. It seems to give investigative agencies greater opportunities for encroaching on personal privacy rights and to dilute congressional controls over how the taxpayers' investment in capital equipment is used.

Moreover, the project exploits many federal computing specialists who took jobs with their respective agencies without realizing they would be roped into supporting conscription. Has anyone asked them how they feel about this?

As the federal tax collector, the IRS already possesses detailed financial information about most U.S. residents. And the agency has been known to pass this information along to the Federal Bureau of Investigation for surveillance of political dissenters.

Then there's the Interior Department. Two years ago, the General Accounting Office said Interior regularly wasted millions of dollars by mismanaging its computing resources [CW, July 10, 1978].

What controls exist over the management of that AS/5 Interior is lending to the Selective Service? How extensive is Interior's role in supporting the draft registration process? Does Congress know or care about the answers to these questions?

Other government investigations have found that many federal agencies are only marginally complying with provisions of the 1974 Privacy Act. And the Carter Administration's proposed fiscal 1981 budget slashes funding for the President's privacy program, which was supposed to shore up compliance monitoring [CW, April 7].

In this light, the pooling of computing resources for support of draft registration, an especially explosive political issue during a presidential election year, seems ill-advised and, from a civil rights standpoint, dangerous.

'Patience, boys! First we decide what to feed it, and then we decide whether it works . . .'

DATA PAST

Five Years Ago
July 30, 1975

STAMFORD, Conn. — Xerox Corp.'s Data Systems Division departed the mainframe scene, but the company would retain certain peripherals, terminals and its DP services business. The move was related to a drastic dip in second-quarter financial results.

MINNEAPOLIS — Control Data Corp. doubled the basic memory size available on its top-of-the-line Cyber 76 series and boosted maximum disk capacity by 50%. The Cyber 76-142 contained 128K 60-bit words of bipolar semiconductor basic memory.

Eight Years Ago
Aug. 2, 1972

OMAHA, Neb. — In a week of confusing legal activity, one court barred IBM from making a scheduled product announcement, but was later overruled on IBM appeal. IBM said it would announce two models in the 370 series — the 158 and 168 — with virtual storage.

DENVER — A computer operator here was arrested and charged with short-circuiting a system at least 56 times in two years. Before the arrest, however, $500,000 had been spent trying to track down the system's problem.

LETTERS

Vsam and FBA Devices

William F. Jurist's benchmark comparison of IBM count-key-data (CKD) and fixed-block architecture (FBA) disk devices was excellent. However, he failed to measure or report on the impact of Vsam, the access method most likely to control any FBA device.

Since Vsam considers FBA to have tracks and cylinders (min-CA, max-CA) and never stores a block number in the catalog, the calculation savings observed by Jurist might be greatly reduced with Vsam.

Wayne C. Sanford
Bowdoinham, Maine

Dispelling Career Myths

Compliments to *Computerworld* and to Sandra K. Sawyer ("If I Flunk Out of Chemistry") [CW, July 14] for the interest expressed and the information provided to enlighten readers about the unclear and incorrect ideas that undermine the identification of data processing career opportunities.

As founder and director of a business-oriented DP technical school which has operated for 15 years, I am keenly aware of the need for available, well-trained entry-level programmers. I applaud every effort to correct misunderstandings rampant about the qualifications and competencies of programmers, the nature of the work they do and the very real rewards — intellectual and financial — to which beginners can look forward.

Stewart W. Swacker
Dallas, Texas

Addition to DBMS Chart

The comparative chart on data base management system (DBMS) offerings was very comprehensive [CW, July 14]. However, there was an omission that needs to be pointed out.

Under "Source Program Languages Supported," Software AG's Adabas also has support for APLSV, VSAPL through TSO, and VSAPL through VSPC. The interface is available using the Interprocess Systems product "Call/AP."

I wish to prevent a possible misconception that no data bases can be accessed from APL OS/VS systems.

Stella Chamberlain
Interprocess Systems
Atlanta, Ga.

Wrong Conclusion

I found "IBM Charges $2,450/Mo for Correct Timing" [CW, July 7] to be of interest, but the conclusion was incorrect.

The MVS under VM/370 user does, indeed, have an alternate choice to bad SMF timing or two undesired IBM products. Amdahl Corp.'s VM/-Performance Enhancement (product number 4PV0-P1) not only provides the primary MVS machine with accurate timing information, but also significantly enhances MVS response and throughput by eliminating most of the VM simulation of MVS privileged instructions.

This is indeed an alternative that users should investigate since it is the only product on the market today that addresses the operational and response/throughput problems inherent with running a production MVS system on the same real machine as VM/370 and provides much more than just accurate SMF timing.

Richard A. Whitcomb
Amdahl Corp.
Sunnyvale, Calif.

Computerworld welcomes comments from its readers. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

COMPUTERWORLD

. . . the one weekly newspaper that's designed to fulfill your unique "need to know" . . . the one newspaper that can give you all the current information you need to benefit you, your organization and your career progress . . . 52 weeks of incisive news, commentary and special reports . . . subscribe today, use the attached postage paid order form.

☐ *Please enter my subscription*
(details on back)

☐ *I'm already a subscriber, but I'd like you to change my:*
- ☐ *address*
- ☐ *title*
- ☐ *industry*
- ☐ *other*

My current mailing label is attached and I've filled in new information on the other side

Put old label or label information here

Please send me COMPUTERWORLD for one year. RATES: United States—$30 Canada, Central & South America—$50
Europe and Near East—$90 Other Foreign—$150 (Airmail Service)

☐ Check Enclosed
☐ Am Ex ☐ BA/Visa ☐ MC

(MC Only - List four digits above your name)

If charge we must have cardholder's signature: _____ Expiration Date: _____

First Initial		Middle Initial		Surname	
Your Title					
Company Name					
Mail To:					
City			State	Zip Code	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld*.

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY
10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurance/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other: _____

TITLE/OCCUPATION/FUNCTION
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
80 Librarian/Educator/Student
90 Other: _____

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CIRCULATION DEPT. 375 Cochituate Road, Rte. 30, Framingham, MA 01701

Detach here, fold, and place in post-paid envelope attached through binding.

READER COMMENTARY/Walter I. Nissen Jr.

Datapro's Computer User Survey: An Analysis

Recently, Datapro Research Corp. published the largest (and to me the most interesting) user survey ever of computer systems ratings [CW, May 19 and 26]. The survey of *Computerworld* readers covered machines of all sizes and comprehensively investigated users' applications and satisfaction with their systems. In presenting the results, Datapro divided the industry into three parts — maxis, minis and micros.

Survey research on this scale presents massive problems to the researcher. Whatever hard decisions are made about coverage, collection, content and presentation, readers and users of the results will want to apply their own judgment in developing interpretations of the data. This is true even of wholly objective observers. The problems are magnified greatly for those of us within the computer industry itself who already have our own subjective points of view.

After reading the published material and making a first pass at the numerical tabulations, I felt the need to do some retabulation to meet some objectives I had developed for myself while studying the material. Some of these objectives were:

1) General satisfaction. I was concerned with general measures of user satisfaction. Study of the smaller details (applications, languages and so forth) must be left for later study.

2) Vendors. The data is presented by system vendor — essentially, this means hardware vendor, since even companies whose only application runs on a third-party proprietary program product are listed by hardware. I wanted to look at the whole range of systems provided by each vendor, aggregating the data for larger and smaller sysems to get an overall measure of the vendor's standing, relative to other vendors.

3) Sample size. Many small companies are represented in the survey by only a few respondents. I wanted to eliminate the smallest of these vendors because the data for these vendors is inherently imprecise, having probable errors greatly exceeding the differences between vendors with larger numbers of respondents. Unfortunately, some vendors with fairly small returns remain in my analysis because only eight vendors had as many as 150 respondents. I chose to draw the line at 36 respondents.

With all due respect to the 10 Tandem Computers, Inc. users and three Magnuson users, I do not feel the data permits comparison of those companies relative to the others. For example, all except one of 44 Amdahl Corp. users and all except one of 39 Prime Computer, Inc. users would recommend their system to another user, compared to all 38 Apple Computer, Inc. users and all 10 Tandem users and all three Magnuson users. Using valid statistical measures, I am unable to distinguish the three larger vendors on this basis, let alone Magnuson. They all appear to be excellent. Hypothetically, if Magnuson were to be put at the top, a single negative response would have plummeted it to the bottom third of all vendors.

4) More Information. The overall satisfaction data reported by Datapro is extremely useful. Still it is only a single number and is based on a minimum amount of data. The question asks the user to distinguish between excellent, good, fair and poor. Is it not possible that those 38 Apple users may have interpreted the question differently than the 44 Amdahl users? I hoped to get some confirmation from other questions.

Rank	Name	Would Recommend System To User (%)	Overall Satisfaction	Replacement Loyalty (%)	Average System Life (Months)	Total Responses
1.	Amdahl	98	3.6	90	22	44
2.	Texas Instruments	96	3.5	100	18	51
3.	Apple	100	3.3	—	12	38
4.	Prime	97	3.3	100	20	39
5.	Hewlett-Packard	87	3.4	67	25	153
6.	Microdata	87	3.4	18	27	45
7.	Wang	92	3.3	38	23	78
8.	Digital Equipment	86	3.1	76	34	475
9.	NAS (Itel)	81	3.2	0	16	37
10.	Datapoint	85	3.1	52	22	79
11.	Basic Four (MAI)	80	3.2	59	26	45
12.	IBM	85	3.0	78	45	1982
13.	Control Data	80	3.1	62	58	36
14.	Radio Shack (Tandy)	80	3.0	35	14	70
15.	NCR	73	3.0	67	42	224
16.	Data General	73	3.0	42	22	158
17.	Four Phase	79	2.9	51	31	36
18.	Univac (Sperry)	68	3.0	81	33	171
19.	Burroughs	72	2.9	69	33	314
20.	Honeywell	67	2.9	34	46	203

Consolidated Ranking of System Vendors by General User Satisfaction

My hopes both for more information and for confirmation were realized as the table shows, but not entirely. Each of the other measures developed has some problems too.

Basically, I developed two other measures of general satisfaction: the percentage of users who would recommend their systems to other users and the percentage of users who were remaining "loyal" to their vendors in their system replacement plans. Actually the first of these was computed by Datapro, but I used a different method.

Datapro computed this percentage for each computer model or group of models and then averaged these results to obtain a value for the vendor as a whole. However, this gives the same weight to the many responses from a very popular model as to the few from a limited distribution product.

So I recomputed the percentage using the number of user responses to form a weighted average. This leads to the interesting result which is detailed below.

However, even this improved result contains a residual problem. Some users evidently considered system obsolescence in answering the question, "Would you recommend this system to another user in your situation?" (This may also be true of the overall satisfaction responses, although probably to a lesser extent).

This complication raises many problems in comparing vendors. We all know that with time computers are getting more satisfying (We do, don't we?). This puts the more experienced vendors at a marked disadvantage, and even those vendors with lower growth rates should be adversely affected. Also a company's marketing/packaging strategy may affect this number, since a host of new product announcements may make a product seem obsolete, even if the new products are only cosmetically different.

This problem led me to consider using the average system life as reported by Datapro to compute an improved measure of general satisfaction, but with these sample sizes I haven't found a way to accurately calibrate such a modification. I have listed the average system life on the accompanying table so that the reader can make his own subjective evaluation.

In this regard, it is interesting to note the relatively good performance of Digital Equipment Corp. despite a rather long average system life and sad to

(Continued on Page 36)

READER COMMENTARY/Paul S. Hoffman

Arbitration Has Its Advantages

Alan Taylor recently stated that arbitration clauses work in the vendor's favor [CW, July 7]. However, Taylor presented a one-sided view and ignored arbitration's possible advantages to the user.

From the user's view, suing in court can be extremely expensive, can consume substantial amounts of management time and can (and often does) take place over a period of several years. In some circumstances, arbitration can come to as fair a result while being cheaper, quicker and less demanding of the time of key personnel.

One major advantage of arbitration is that much less management time may be required. Management people involved on the user's side tend to be key people, those who can least be spared to cope with protracted litigation. Although solid preparation tends to be concentrated and the dispute resolved within a few months.

Less Expensive

Another important advantage of arbitration is that it is substantially less expensive than suing in court. A 10-to-one difference in cost would not be unusual. Of course, there are costs associated with arbitration. In addition to legal fees (if you use a lawyer), the American Arbitration Association (AAA) charges administrative fees for handling arbitrations. Fees are assessed on a sliding schedule. Some representative fees for varying amounts in controversy are as follows:

Amount at Issue	AAA Fee
$10,000	$1,300
$100,000	$1,350
$1 million	$3,850

AAA Commercial Panel arbitrators normally are not paid unless more than two days of hearing are required. Most commercial arbitrations run two hearing days or less. In cases that will require either substantial amounts of arbitrator time or special expertise on the part of the arbitrator, the parties may agree to compensate the arbitrator from the beginning.

Fast Procedure

Arbitration is fast. The average commercial arbitration is completed with two days or less of hearings and a front-to-end time of three months from demand for arbitration through the arbitrators' award.

Taylor stated that the discovery procedures available in court are not available in arbitration. This is true, but if arbitration permitted the exhaustive discovery process permitted under the Federal Rules, it would do away with its ability to speedily resolve disputes! An arbitrator (whether a lawyer or not) *does* have the power to subpoena documents, and the parties have ample opportunity to submit their own documentary evidence as well as their own oral testimony. The parties also have the ability to cross-examine the other side's witnesses.

In an arbitration, the rules of evidence tend to be applied less formally than they are in court. An arbitrator might say, for example, "We'll let it in for what it's worth." This can sometimes be an advantage to a computer user.

Another advantage of arbitration is that the arbitration clause in a contract may specify the location of the arbitration tribunal. If you are a user in New York, you may wish to specify that any arbitration will be conducted there. Although all contracts (whether or not there is an arbitration clause) tend to say what state's law will be applied, you cannot specify the location

(Continued on Page 39)

THE TAYLOR REPORT/Alan Taylor

PL/I Escaping Hardware Vendor Control

PL/I has been closely connected to hardware vendors — primarily, of course, IBM — from its inception 16 years ago. Now, following Cobol's movement towards becoming a viable software industry product rather than just a tool for selling hardware products, PL/I is similarly demonstrating its ability to escape from hardware vendor control.

The first software-house PL/I is called PL/I-80 and was quietly issued by Digital Research, Inc. for noncommercial use only early this summer. It is something more than a compiler and does have a tie-in operating system family, Digital Research's own CP/M and derivatives including the new CP/Net. So the compiler itself was not designed to be totally transportable — just hardware transportable.

But a different Ansi X3J1 Committee action seems to have filled in the gap and is making the programs really portable across operating systems too. As a result, PL/I is getting the liberation it lacked in the past and now has a new opportunity to prove itself.

The PL/I-80 language clearly rejects the concept of unnecessary vocabulary or facilities. Floating decimal has been dropped as a numeric data form, but both fixed decimal and floating binary have been retained.

The omissions from the X3J1 Committee's Subset G definition (dynamic arrays, asterisk extents, DEFINED, LIKE and PICTURE) do not prevent many applications from being defined and executed, although there can be a certain loss of automatic inward portability or efficiency.

As for additions, there is a preprocessor control "%REPLACE" which allows constants to be inserted throughout the source program prior to compilation. This makes tailoring of generalized systems a lot easier.

More important additions, however, are the added Ascii group. PL/I-80 has not made the traditional PL/I error of undervaluing I/O convenience. It has added Ascii file processing, permitting variable-length Ascii records and supporting editing and other functions.

Particularly significant is that these additions to the standard are themselves almost de facto standard, having been added into Wang Laboratories, Inc., Data General Corp. and other Subset G PL/Is for minis. So, unlike most extensions, they may facilitate compatibility rather than hurt it.

Execution Efficiency

The compilation goes directly to 8080 machine code, rather than through an interpretive process, so the final program can run — and run fast — on any 8080, 8085 or Z80-type systems. Suitable configurations are being extended from the original dedicated systems to the master-slave networks which will be able to be used when CP/Net is delivered.

(A recent study performed at the National Computer Conference has apparently confirmed the effectiveness of this approach, by placing PL/I-80 above some 40-odd other micro languages. However, a full review of the figures to check on their validity is not yet available.)

Cost, Education

PL/I-80, not including the operating system, is priced much lower than minicomputer compilers. It lists at $500 for noncommercial use, with special terms for purchasers before the end of July. Pricing is certainly one of the advantages of software-house languages. Even though the hardware vendor wants its systems to be powerful, it is not looking to supply much outside its captive market; and within that, it expects to have to add bells and whistles for hardware, rather than software, marketing reasons. All of this can keep prices high.

While PL/I-80 was not itself built to provide for operating system portability, it does encourage it by having an unusual depth of compiler compatibility with the other developers who have provided PL/I Gs for their own operating systems. This has resulted from the success of a standards project which took a different approach to developing the standard specifications.

Standard specifications normally cover only the languages, not the many difficulties in interpreting the specification. This difficulty has been compounded in the case of PL/I and has helped make it unpopular.

The X3J1 Committee dealt with the unnecessary power by issuing a sufficient, but nonredundant, subset, Sub-

(Continued on Page 39)

In a world full of uncertainty, we certify every flexible disk we make. Not every other one.

While other companies have been putting a lot of money into sophisticated advertising, we've been putting a lot of money into sophisticated test equipment.

And putting the test equipment to work on every disk we make.

That way, the only *Ectype*™ Flexible Disks you can buy are disks that have been 100% certified error-free. At higher than standard industry specs.

* Ectype is a real word that means a faithful reproduction.

Our disks live longer, too. Because we add all the correct ingredients to our initial formula. Instead of adding some later as an afterthought.

The result is wear life that exceeds 10 million passes!

Ectype disks are hard to lose and easy to use, too. Because they come in an E-Z Vue box that protects them and doubles as a file system.

So in addition to 100% certification, you get 100% convenience.

For full details, call us at (605) 996-8200.

SYNCOM. Your flexible alternative. ©1980 SYNCOM, division Schwan's Sales Enterprises, Inc.

P.O. Box 130, Mitchell, SD 57301

DATA BASE SEMINAR
Oct. 20-24, 1980
Costa Mesa, Ca.
(Nr. Orange Cty. Airport)
APPLICATION-IMPLEMENTATION
DATA DESIGN MODELS
NEW DATA BASE DIRECTIONS
Fee: $375.
for information, write:
DATA MANAGEMENT SYSTEMS
P.O. Box 884
Carlsbad, Ca. 92008
or
Phone: (714) 438-5831
(in-house seminars also offered.)

What it means to be the worldwide leader in IBM-compatible computers.

At National Advanced Systems, we offer the broadest range of IBM-compatible computers on the market. Our systems have met with unprecedented customer acceptance. In fact, we now have the largest installed base in the entire industry.

This leadership position isn't one we take lightly. We've dedicated ourselves to providing complete data processing solutions which help decrease your cost of doing business. And that's especially important in these times of recession, inflation, and high interest rates.

Why compatibility?

The concept of compatibility has allowed manufacturers such as ourselves to provide superior price/performance alternatives to IBM users. As a result, the IBM-compatible segment is now growing twice as fast as the rest of the data processing industry. And we're committed to remaining at the forefront with all the necessary services and technological advances, because we understand your need to increase productivity while protecting your investments in IBM software, hardware, and training.

Systems to fit your needs.

Our Advanced Systems product family is backed by a $1 billion multinational corporation. Our systems offer unequaled price/performance, and boast higher residual values over time than do IBM systems.

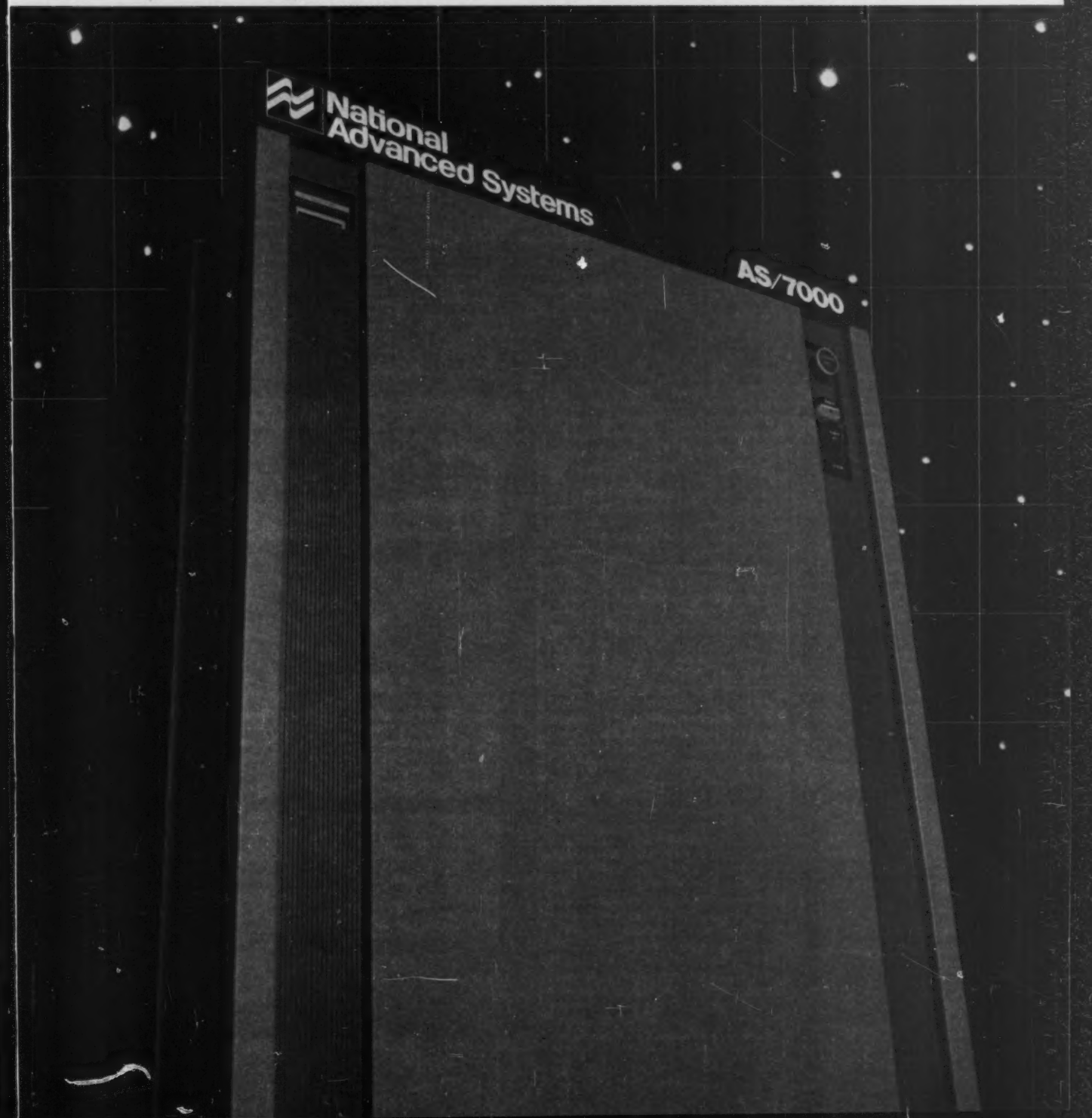
The family ranges in size from our medium-scale AS/3000 to our top-of-the-line AS/7000DPC which outperforms the IBM 3033. In terms of reliability, our Advanced Systems family has set new standards in the field.

And, of course, our systems are backed-up by the finest service and support force in the entire industry.

For more information, contact your local National Advanced Systems sales office, or contact Marketing Dept. A1, 3145 Porter Drive, Palo Alto, CA 94304, 415/856-5000.

National Advanced Systems. When it comes to compatibility, no one else even comes close.

National Advanced Systems
The Compatible Computer Company
A subsidiary of National Semiconductor



Datapro Computer User Survey: An Analysis

(Continued from Page 33)

contemplate the presence of Radio Shack and Data General Corp. in the bottom half despite short average lives.

Replacement Loyalty

The other measure of general satisfaction developed here is the percentage of those users who, having decided to replace their current system, have also decided to purchase the system from the same vendor.

The main problem with this measure is sample size. Few users have firm plans to replace their systems. In Apple's case, no users have such plans. As stated above, such low incidence makes comparison difficult.

A lesser difficulty is the variation from vendor to vendor in the feasibility of replacement. For this question, replacement is probably (but to an unknown degree) dominated by capacity upgrade.

A vendor's number is consequently affected by the breadth of its product line, compatibility within that line, the prevalence of sales of its top-of-the-line model and the phasing of his new products, not to mention whether he has plug-compatible competition. Still, a repeat purchase is a very strong recommendation and I feel this is also a very useful measure of general satisfaction. One can also argue that replacement in itself is a measure of dissatisfaction, but this seems to me to be strongly dependent on a number of other factors not accounted for here.

The Table

The accompanying table represents my attempt to form a consolidated list of vendors ranked by general user satisfaction. Basically this is very similar to Datapro's rankings. I have combined the data for computers of all sizes.

The rankings are based on two measures: Overall satisfaction and the percentage of users who would recommend the system to another user. The measures of vendor "loyalty" and average system life are provided for use in evaluating the ranks, but were not used to compute the ranks.

Generally speaking, vendors whose ranks differ by three or four or less should be considered to be virtually equal in rank. On the other hand, based on the consistency between the various measures and on my own evaluation of the accuracy of the data, a difference of seven or more in rank is significant. In particular, no vendor in the bottom third "deserves" to be in the top third.

Comparisons

I make these evaluations while keeping in mind the status of the computer industry as a whole. It is arguably the most innovative and dynamic industry the world has ever known. It is, the government's argument in U.S. vs. IBM notwithstanding, a very diverse industry with many specialized market shares. Every vendor brings particular strengths to the field. The lower ranked firms can justify their claims to excellence.

But the object of this analysis is to distinguish the vendors one from the other. The results may be only to identify "la creme de la creme." The people who have built and contributed to the higher ranked firms should feel a special pride not shared by those of the lower ranked firms.

I feel the results as presented in the table are somewhat more accurate than a ranking based solely on overall satisfaction. This feeling is partly based on the notion that two measures, like two heads, are better than one. Also the recommendation question is more specific than the overall satisfaction question and more directly requires the user to make a comparison.

Finally, the combined ranking more accurately reflects my own personal evaluation. I hope that this is more a validation of the methodology which produces the combined ranking than an excuse for modifying the data to support a preconceived notion.

In particular, in the combined ranking, Prime, DEC and IBM stand slightly better than the overall satisfaction value alone would indicate. To me, this seems accurate.

Three Levels

The most striking result seems to be the concentration of a majority of the larger vendors in the bottom third. In other words, relatively few users have chosen the highly satisfying systems.

An immediate but speculative conclusion from this data is that users are very poor at picking computers and computer vendors, so poor that a large majority end up less satisfied than the few users who pick the more satisfying vendors. If you are willing to make that jump, you might find therein some support for the notion that in an emerging technology like computers, only an inner circle of initiates really understands the technology and the rest of us are condemned to just muddle along.

This leads into the interesting result mentioned earlier. As mentioned there, I recomputed the percentage of users who would recommend their systems. In doing so, I found that for most vendors, the recomputed value was higher than the unweighted value, frequently substantially higher. Numerically, this is a direct result of the fact that most vendors have sold more systems which are highly recommended. Speculatively, then, one might conclude that although buyers do not know how to pick vendors, at least vendors do know which computers in their lines are most likely to satisfy the customer.

Not only are the vendors with large numbers of respondents nearer the bottom, but there is a tendency for makers of large systems to be toward the bottom. Here Amdahl is an obvious exception. Also all of the companies in the bottom third make minis (or midis), but they are mostly mainframers for whom minis are a relatively small part of their dollar volume.

Excepting Amdahl, all of the top eight make smaller computers. Perhaps it shouldn't be surprising that, as we move toward distributed processing and personal computing, smaller computers are more satisfying.

In conclusion, this excellent survey provides much useful data in a very interesting market. Proper interpretation of the data requires a good deal of judgment mainly because of the small samples for the smaller vendors and because of the necessary oversimplification of complicated issues.

The data does not support a meaningful distinction between each pair of vendors but does support clear distinctions between the higher and lower rated firms.

To CW and Datapro I can only say: Thank you and I hope you will do it again even better in the future.

Copyright 1980 by Walter I. Nissen Jr. All rights reserved.

Nissen is the data processing manager for the Washington, D.C., tax law firm of Haynes & Miller.

Developing Commercial Applications for Small Business Computers?

INSIST ON MICROCOBOL®

Development standards: In COBOL, the standard language for business applications.

Total software environment: MicroCobol is the only development tool you need...with its own interactive Business Operating System, Compiler, full Utilities (including two SORTs), Symbolic Debugging System, Report Writer (AutoClerk®), online inquiry/DBMS (AutoIndex®), and much more.

Reliable support: MicroCobol is a development of CAP-CPP, one of the world's oldest and largest pure software companies, with over 3,000 programmer-years of COBOL background.

Guaranteed return on software investment: MicroCobol expands the range of machines your applications support and eliminates worries about second sources or the next generation of processors. Because MicroCobol-written applications are absolutely portable to any MicroCobol-supported environment. They operate identically on IBM Series 1 and DEC PDP-11, and an expanding array of machines based on 8080/85, Z80, 6800, 9900, and soon the 8086, architectures.

Send for more information: Mail the coupon today.

YOU NEED MICROCOBOL

Please send information about:
☐ MicroCobol. ☐ Distributorships.

Name Title
Company
Address
City State Zip
Telephone
Nature of Business

CAP-CPP
CAPCPP Inc.
1101 State Road, Bldg. O, Princeton, NJ 08540.
Tel: (609) 924-2700.
299 California Ave., Palo Alto, CA 94306.
Tel: (415) 326-1379.

HP 3000
HARDWARE AND SOFTWARE

- SUCCESS-PROVEN PACKAGES installed and supported by their developers, Hewlett-Packard and Data Systems for Industry.
- FIXED PRICE AND SCHEDULE with hardware-software discounts and leasing available to qualified customers.
- INTERNATIONAL SUPPORT FROM OFFICES IN — Los Angeles New Jersey Dallas Europe

ACCOUNTING
- Payroll, Personnel
- Labor Distribution
- Accounts Receivable
- Accounts Payable
- Fixed Assets
- General Ledger

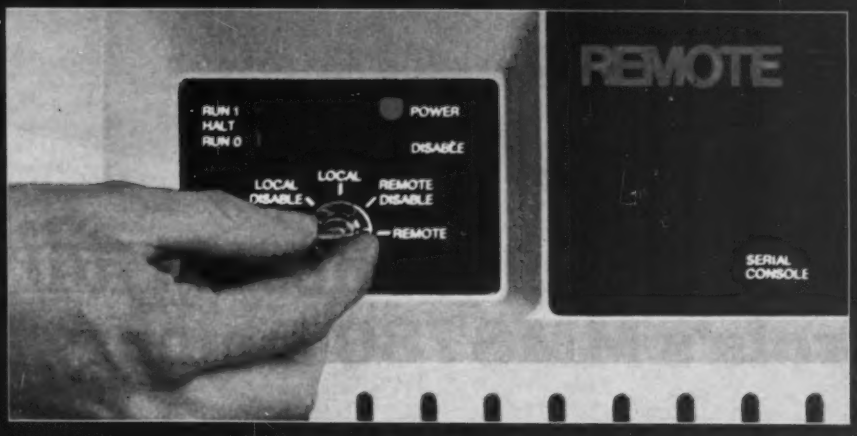
MANUFACTURING
- Order Entry
- Bill of Material Processing
- Inventory & Order Status
- Material Requirements Planning
- Shop Floor Control
- Capacity Reporting

DISTRIBUTION
- Order Entry
- Multi-Inventory
- Shipping
- Billing
- Replenishment Planning
- Distributed Processing

DISCOUNTS AND LEASING
- Up to 24% volume discounts on hardware-software system sales
- Hardware only or package hardware-software leasing.

DATA SYSTEMS FOR INDUSTRY
3450 E. Spring Street, Long Beach, CA 90806
(213) 595-5601

DIGITAL PRESENTS A MAJOR ATTACK ON DOWNTIME.



In "Remote" mode, your computer is linked to our Diagnostic Center in Colorado Springs.

Day or night, Digital's computer-to-computer Remote Diagnosis ►►►►► goes into action within 15 minutes of your call.◄◄◄◄◄

At Digital, we know that your tolerance of computer downtime is very low.

So is ours.

That's why we've developed computerized Remote Diagnosis,* the first of its kind.

When a Digital system has a problem, a toll-free phone call and the simple flick of a switch launch a coordinated effort to get that system up and running as soon as possible. Within 15 minutes, our Remote Diagnosis computer in Colorado can run a troubleshooting program on your system via a voice-grade phone link. If we have to send service representatives, we send them prepared. Remote Diagnosis lets them know exactly what's wrong and what they need to fix it before they arrive on the scene.

During off-peak hours, we can run a preventive maintenance program that won't interfere with normal use. Done regularly, Remote Diagnosis goes beyond troubleshooting. It pinpoints potential problems while they're still merely potential.

We take a lot of pride in the way our computers perform. And we take it very personally when they don't. So we'll keep looking for new ways to serve you better and hold maintenance costs down.

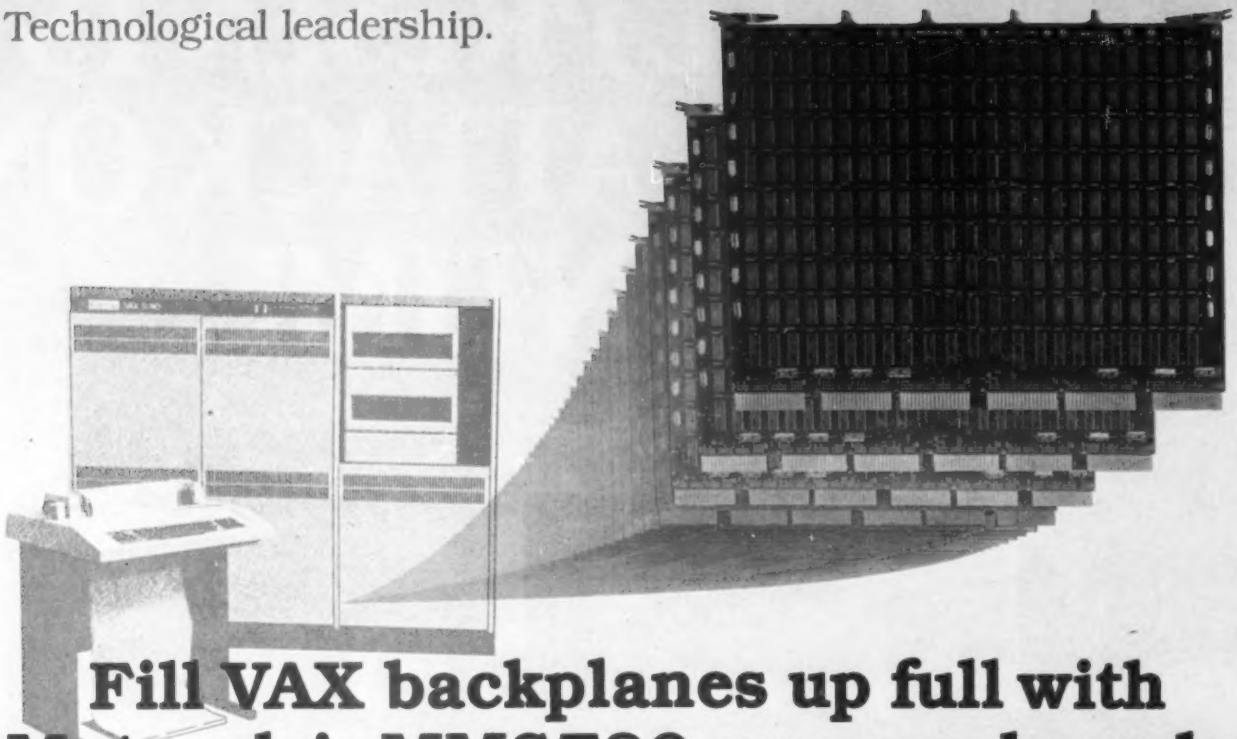
At Digital, the war against computer downtime is never over.

Write: Digital Equipment Corporation, Field Service Marketing Communications, PK3-2/S25, 129 Parker Street, Maynard, MA 01754.

*Available on: VAX-11/780, PDP-11/70, PDP-11/44, DECsystem-10 and DECSYSTEM-20, DEC Datasystem 570 and DEC Datasystem 540.

digital

Technological leadership.



Fill VAX backplanes up full with Motorola's MMS780 memory boards.

That single, lonely 256K-byte memory board that came with your VAX no longer need be a solitaire.

Motorola's MMS780 memory array add-in board is here to fill your expectations and your VAX backplane to full capacity.

VAX-compatible, quick-delivery.

The MMS780 module provides 256K bytes of semiconductor memory on a single board which is hardware and software compatible with DEC's VAX 11/780 minicomputer. It's equivalent to DEC's M8210 memory array card, uses 16K × 1 MOS memory devices and is configured as a 32K word × 72 bit (32K × 64 + 8 ECC) memory. The MMS780 is essentially a memory array card since all timing and control functions are determined by the VAX memory controller.

Price . . . $10,000 per megabyte.

Delivery . . . 30–60 days, ARO.

PDP-11 and LSI-11 memory boards, too.

Our MMS1117 is a 64K × 18 memory board for most PDP-11s because it plugs into a standard hex SPC slot. Our MMS1119 gives you a full 128K × 18 memory capacity for PDP-11/04, 11/34, and 11/60s. You can even expand to a full megabyte on a single board with our MMS1119 using Motorola's MCM6664 64K RAMs.

Our MMS1102 provides 32K × 18 memory for LSI-11 users and can be expanded to 256K bytes using 64K RAMs for maximum memory per board.

PDP-11, LSI-11, and VAX are trademarks of Digital Equipment corporation.

Add-Ins for Intel.

Our MMS8064 provides 16K, 32K, 48K, and 64K word memory for Intel SBC 80/10, 80/20, and 86/12 microcomputer users . . . a smart alternative if your source lets you down.

Motorola . . . the smart memory systems choice.

Backed by a two billion dollar corporation . . . Motorola Memory Systems is here to stay. We are industry leaders with the 64K RAM and 64K EPROM. Our designers apply this state-of-the-art expertise to every board we produce and each board shipped goes through extensive testing and burn-in. Our manufacturing workmanship is unsurpassed in the industry. With nationwide system engineers, we are committed to supporting our customers.

Call Toll Free.

1-800-531-5118 for direct factory assistance (512-928-6776 in Texas) or write Motorola Semiconductor Products Inc., P.O. Box 20912, Phoenix, AZ 85036 for data. Motorola is your main memory system source with

Innovative systems through silicon.

MOTOROLA INC.

HUMAN CONNECTION/Jack Stone

Systems Managers Describe Life at the Top

The highlight of this year's conference of the Association for Computing Machinery's (ACM) Special Interest Group on Computer Personnel Research (Sig CPR) was a panel discussion on the subject of education of top management. The participants were old-time systems professionals who themselves had risen to executive levels and deal on more-or-less a daily basis with the chief executive officer (CEO) of their organizations.

Topics ranged far beyond purely educational considerations, and the audience gained a rare insight into the personalities and attitudes of former systems people who have who've made it to the executive suite.

The panelists included Frank M. Heinzmann, vice-president for computer and communications services at Eastern Air Lines; Thomas L. McGovern, director of computer services and information systems for Dade County, Fla; and Vincent Swoyer, group director for corporate systems at Ryder Systems. The moderator was Alan Parker of Florida International University.

Following are some of the panelists' observations regarding information processing as it concerns top management.

• *On the Major Concerns of the CEO:* It is not surprising that the DP budget is of primary interest to the CEO. Regardless of industry, the aim of top management is to control — better still, cut — operating costs. Yet the DP executive continued to ask for and receive budgetary increases because the investment in the information systems function results in a big payoff: productivity gains.

But the extra dollars don't appear willy-nilly. Many man-months of planning effort are required by the information processing and CEO staffs to hammer out an acceptable expanded program.

"We've got to do our homework and justify every line item of expense," panelists stressed. One panelist even reported that he must develop decremental budgets to provide program alternatives for various levels of budgetary *cuts!* Another noted that each of his major programs has a postinstallation audit to validate the cost/benefits that were originally forecast.

• *On Communicating With the CEO:* The big day with the CEO is the presentation of the final budgetary package. Typically the DP executive gets all of 15 minutes to compress the year-long studying, analysis and politicking. He sometimes has to make his voice heard over the din of user naysayers who wonder aloud, "Why should our budget be slashed again and his increased?"

So much for the dollar picture. Let's look at operations. Heads of each major functional unit, which includes the information systems department, meet with the CEO on a daily basis to present their "report cards": brief statements or summary graphs on the *previous day's* performance vs. objectives. High on the list of parameters are operating reliability and system security.

• *On the Education of the CEO:* Although CEOs have strong records of achievement in one or more of the functional areas of the business, they have rarely come up the information processing ladder. They need training, recognize this need and the systems executives provide it, usually in the form of periodic one- or two-day outside seminars.

• *On the Question, "How Critical Is the DP Exec/CEO Relationship to the Future of the DP Department?":* Of course, it's very important. But more so is the positioning of the information system activity within the structure of the overall organization. For example, the decentralization vs. centralization issue is of paramount concern because it deals with the subject of ultimate control of the information processing resource. But this and other organizational issues also relate to the careers of capable, professional people in both the user and management information services establishments. Therefore, the discussion on this issue is usually subjective, if not emotional — sometimes, heatedly so.

For this reason, the systems executive must be willing to enter the political and business battles that are part of the thrill of being high up in the corporate or government structure. Otherwise, he will wind up as just another statistic in the extravagantly high turnover rate (20% to 25%!) that is currently associated with the position.

PL/I Gaining Freedom

(Continued from Page 34)

set G. This has now been picked up by many PL/I vendors and has its own following.

In addition to this normal document, X3J1 has also issued a "Large Document" that describes, from the compiler developer's point of view, how to write the compiler. And that seems to have done the trick to gain operating system transportability for PL/I.

Daniel Davis, who is in charge of PL/I maintenance, tells me that this information is the keystone to keeping PL/I-80 free from becoming incompatible with the other Subset Gs, so that here again we are able to get a real liberating development of the language.

Together, the liberation from hardware and compiler-interpretation differences can at last allow PL/I to shed its old image and become a more popular and more effective weapon in the hands of programmers in general.

© Copyright 1980 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for noncommercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld.

Arbitration Has User Benefits

(Continued from Page 33)

of a court for a lawsuit.

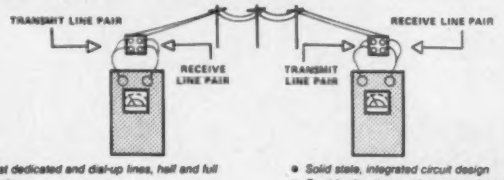
Still another advantage is the chance of getting an arbitrator with some knowledge of your business, knowledge of law, knowledge of computers or possibly all three.

Although an arbitration clause is not for every computer user and every contract, in appropriate cases arbitration can provide effective dispute resolution with speed, economy and minimum management time drain.

Hoffman is a member of the AAA Commercial Panel and is chairman-elect of the American Bar Association Section of Science and Technology.

TP-260
DATA LINE TESTER

The TP-260 Data Line Tester offers the user the ability to test both dedicated and dial-up telephone lines and get a quick indication of suitability for data transmission. The unique design of the TP-260 is such that these tests can be carried out by unskilled persons and results are read directly in terms of tarriffed requirements for data lines.



- Test dedicated and dial-up lines, half and full duplex
- Hand-held, battery operated
- Audio output tests continuity, circuit noise
- Solid state, integrated circuit design
- Trouble shooting can be accomplished by unskilled personnel

TeleProcessing Products, Inc.
Local Data Distribution
4565 E. Industrial St., Bldg. 7K, Simi Valley, CA. 93063 (805) 522-8149

EXCLUSIVE OFFER
EXECUPORT 300
PORTABLE TERMINAL (Factory Reconditioned)
$995 LIMITED QUANTITY AT THIS PRICE (ORIGINAL PRICE—$3300)

- Portable, light-weight terminal
- Operates at 10-15-30 cps
- Thermal printer
- Quiet NCR mechanism
- Built-in acoustic coupler
- Upper & lower case
- Carrying case

ALSO AVAILABLE
EXECUPORT 3000
ONLY $1495 (Factory Reconditioned) (original price-$4000
Wide carriage-132 column with graphics

Both EXECUPORTS include...
- 90 day warranty
- Maintenance contract available for $312/year

QUANTITY DISCOUNTS AVAILABLE

INEXPENSIVE, ONE-STOP COMPUTER HARDWARE, SOFTWARE & MICROFILM SHOPPING!
iTi
information technology, inc.
56 Kearney Road, Needham, MA 02194/(617) 444-5702/TWX 710-325-6838
• New York (212) 938-5945 • Houston, TX (713) 759-0730
• Manchester, NH (603) 668-5977 OEM Inquiries Invited

Sleeves of TYVEK* protect your data investment better than paper.

Here's why:

1. TYVEK spunbonded olefin has more than twice the strength of good quality paper.

2. TYVEK does not lint.

3. TYVEK is smooth and nonabrasive.

4. TYVEK is chemically clean...has a neutral pH.

5. TYVEK reduces static problems.

6. TYVEK is unaffected by water.

With TYVEK, you don't have to compromise on any important sleeve criteria. You get it all. That's why TYVEK is still the best way to protect your diskettes.

For more information, write: DuPont Company, Room 38184, Wilmington, DE 19898.

*DuPont registered trademark

DUPONT

REG. U.S. PAT. & TM. OFF.

Package Supports Structured Method

NEW YORK — A structured systems development methodology package that incorporates the techniques of structured analysis, structured design, structured programming and walkthroughs is available from Structured Methods, Inc.

Metasystem 1000 is said to balance the rigors of such techniques by "a strategy of staged commitment in a series of successively more detailed analysis and design cycles, aimed at management's need to control risk."

The Metasystem 1000 is presented as a structured specification with data flow diagrams to show development tasks, process descriptions to detail the steps to be performed in each development task, and data descriptions for all of the life-cycle deliverables. It is packaged in loose-leaf form.

The license fee for the package is $1,000, which includes the first copy and one year of quarterly updates. Additional copies cost $100 each, update service included. Structured Methods, Inc. is located at 7 W. 18th St., New York, N.Y. 10011.

'Trans IV' Update Suits DOS/VSE

LOS ANGELES — Release 2.0 of its interactive application development system for CICS/VS installations is now available from Informatics, Inc. The updated Trans IV is fully operational under DOS/VSE as well as OS/VS and DOS/VS, the vendor claimed.

Current DOS/VS users will have the advantage of uninterrupted use of Trans IV when they migrate to 4300 systems under DOS/VSE, a spokesman said.

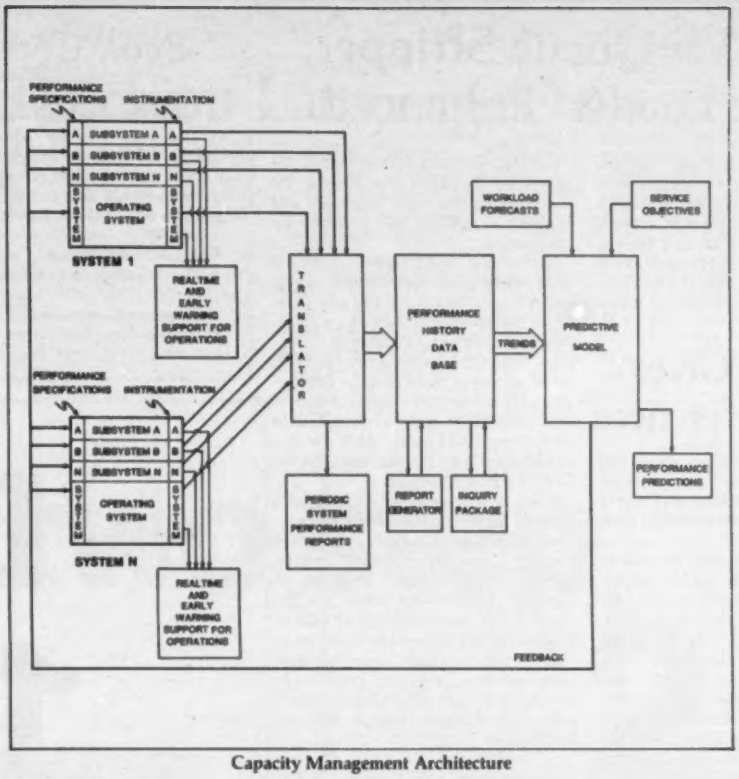
Trans IV enhancements within Release 2.0 include expanded error-handling procedures and error messages. Added cursor control capabilities provide the user with more flexibility in application design, the vendor said.

DL/1 Interface

In addition, new DL/1 interface capabilities provide easier access to DL/1 data bases, and improved procedures for fixing software problems at a customer site result in more timely response to customer needs, the spokesman claimed.

Trans IV is an interactive approach to developing on-line applications under CICS/VS. Existing staff with no CICS expertise can use it since CICS functions are performed automatically by the system.

The price for Release 2.0 is $25,000, Informatics said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.



Capacity Management Architecture

B&B Planning Tools to Ease Capacity Planning Decisions

By a CW Staff Writer

SUNNYVALE, Calif. — Users are becoming increasingly aware of the capacity planning problem, but today's data center manager still depends heavily on expensive and hard-to-get systems programming skills for solutions.

What is needed, then, is capacity management software to provide data geared more for management and less technically oriented to the systems programmer, according to Jack E. van Kinsbergen, president of Boole & Babbage (B&B) since May.

It is this gap that B&B intends to fill with an integrated family of software tools that will collect data on computer resource performance and utilization and also format data for historical trending as well as create a model for predicting future system capacity needs.

In making this directional statement, van Kinsbergen noted his firm has drawn up requirements specifications for a software series it plans to introduce in mid 1981. The products will integrate three functional levels of capacity management which he described as follows:

- At the first, or instrumentation, level, capacity management software tools must collect operating system data that shows how well software is using the hardware for a given job mix. This information is critical to the system programmers' tuning efforts.
- Level two involves the collection of historical work load information into a data base that is structured to automatically produce trend information that shows the increase in work load and its effects on the system for the past days, months and years.

For these trends to be meaningful to data center management and planning personnel, they must be automatically assembled and presented in formats that correspond with the user organization's business environment.

- At the third level, system information and work-load trends merge into a predicitive model to tell management when and where capacity problems will occur. Such a model should show what resources will be required to provide a certain level of service

(Continued on Page 42)

PREVENT "*Wild Cards*" IN YOUR DATA with... SUPER-MSI Multiple Systems Integrity Facility

Consider - SUPER-MSI... **SHARED DASD USERS:**

- **PROTECTS YOUR DATA INTEGRITY** by preventing simultaneous destructive updates by jobs in different systems.
- **Eliminates RESERVE Lock-outs** (both performance Lock-Outs and "deadly embrace").
- **DOES NOT SACRIFICE RELIABILITY** as do other approaches to the problem.
- **Now has extended VSAM Dataset Integrity** to specifically handle the internal VSAM Dataset SHR options.
- Informs Operators and/or TSO users (as appropriate) about the precise task (job, TSO user, etc.) causing dataset conflicts.
- **Provides powerful operator commands** to Control and Monitor performance and activity.
- Is **TRANSPARENT** to users, and almost transparent to operators.
- **Is Independent of system environment** — for example, it works equally well with MVS, MVS-SE, SVS, MVT, VS1, MFT, HASP, ASP, JES2, JES3, etc.
- **Can be installed in 10 minutes** without an IPL and with **NO SYSTEM CHANGES** whatsoever.
- MSI is already being used in well over 400 installations throughout the world.

For More Information, or to Order a No-Obligation FREE TRIAL...

In Europe: Mr. J.A. Kaluzny, UNILEVER GMBH • 15 Dammtorwall 2 Hamburg 36 • West Germany, **Tel: 040 3499 2329**

From Anywhere Else: ALLEN SERVICES CORPORATION, Software Dept•212 W. National Rd. Vandalia, Ohio 45377, **Toll-Free: 800-543-7583 x 203** (in OH: 513-890-1200)

ALLEN SERVICES CORPORATION

MSM for Shared TAPE and DISK Mounts

Transparently Manages Shared TAPE and DISK Mounts

- **MSM** *automatically controls* **TAPE ALLOCATIONS** among your systems. *MSM also works for* **SHARED MOUNTABLE DISKS.**
- **Allows more EFFICIENT TAPE DRIVE UTILIZATION.** Your tape drives will be treated as a single combined pool, rather than several smaller ones. This will have a tendency to reduce overall tape drive requirements.
- **Alleviates confusing operator burdens.** Without MSM, operators must manually coordinate device usage among the various systems.
- **ELIMINATES COSTLY JOB RE-RUNS** due to inadvertent multi-system tape allocation.
- Provides a **SINGLE-SYSTEM IMAGE** with respect to device allocations.
- **MSM is COMPLETELY COMPATIBLE** with the standard operating system allocation philosophy. MSM simply extends it to cover all systems in your complex.
- **MSM is the ONLY TRANSPARENT APPROACH** to handling SHARED TAPE and SHARED DISK allocation.
- **MSM** *now runs with* **MVS, SVS, MVT, VS1 and MFT.**
- **New SOFTSWAP feature** allows MSM to reduce the scope of allocation "blockage" when a DDR tape SWAP occurs.
- MSM can be installed in **10 MINUTES** — NO IPL is required.
- Requires **NO SYSTEM MODIFICATION** whatsoever.
- Additional overhead caused by MSM is INSIGNIFICANT.
- MSM is now being used in well over 100 installations throughout the world.

To Acquire MSM, or for more information . . .

Toll-Free: 800-543-7583 x 203
(in OH: 513-890-1200)

ALLEN SERVICES CORP.
Software Dept. 212 W. National Rd.
Vandalia, Ohio 45377

'PowerVS Queue Stripper,' 'Queue Loader' Enhanced

DALLAS — Sercon Corp. has announced enhancements to its PowerVS Queue Stripper and the PowerVS Queue Loader, including VSE support that allows operation on any Power/VSE-supported disk drive such as the Fixed Block Architecture (FBA) available on the IBM 4300 line of mainframes.

Installations with IBM 4300 or Power/VS Release 1.0 or Release 2.0 may not utilize the Stripper and Loader, according to a company spokesman.

The Stripper and Loader support the IBM shared spool file feature available under Power/VSE R2.0, and any number of Stripper/Loader jobs may be executing in different partitions on different CPUs with or without Power/VSE active on any of the CPUs, he added.

In addition to VSE support, several new capabilities have been added to the Stripper and Loader which are now available for both the VSE user and the DOS/VS R34.0 user.

These new capabilities include processing of all Power/VS(E) dispositions (D,K,L,H), job-level enqueue to prevent operators from altering Stripper-selected jobs, creation of standard DOS/VS(E) labels on the Power/VS(E) formatted output tape as a user-selected option for those users who utilize automatic tape management software, selection criteria expanded to include job selection by priority, job number, system ID and RBM count.

The addition of these new features and support of VSE Release 1.0 and Release 2.0 are available to existing or new users at no additional fees to the normal $1,000/year lease fee for the two programs, or the $750/year lease fee for use of one of the programs. The Stripper and Loader are available for 30 days free trial without any obligation. Lease fees include maintenance, support and documentation.

Additional information may be obtained from Sercon Corp., 4611 N. Lindhurst, Dallas, Texas 75229.

Glossary Gives Cross-References

SPRINGFIELD, Mo. — A Cobol Glossary that produces several cross-reference lists using a library of source programs is input as available from MacKinney Systems.

The cross-reference lists are said to take the "guess work" out of conversions and maintenance by showing the user every program that uses the field, literal, called subroutine, file, copy book or device being changed.

For example, if Zip Codes were changed from five digits to nine, a user could quickly find every statement in every program where Zip Codes were used by looking at the data element cross-reference list, the vendor said.

The glossary produce nine reports, according to the firm. Reports showing where data elements and literals are used will show either the program name only, program name and sequence number, or the entire line of code where the element was used.

Cobol Glossary costs $395 for a 99-year lease or $99 for a one-year lease. MacKinney Systems is located at 1412 E. Locust, Springfield, Mo. 65803.

Tools to Aid Capacity Plans

(Continued from Page 41)

at a specific future work load and assist in preventing unnecessary equipment acquisitions.

"Since delivery of hardware today can take months or even a year, it is crucial that decisions on future resource needs be made well in advance," van Kinsbergen stated. And in light of the high costs of technical personnel, "data center management can no longer afford to depend on a staff of programmers to analyze and massage data into a form that is meaningful for decision making; decision-making information must be available on demand and at a reasonable cost."

To further underscore that management and technician look at performance differently, van Kinsbergen drew an analogy between the computer system and the automotive system: A car mechanic wants to know about vacuum pressures and compression ratios while the manager of mechanics — the user — is more interested in miles per gallon and repair rate.

Similarly, systems programmers add up CPU requirements of today's work load, whereas data center management might like to predict future needs based on historical trend data such as how much the work load has increased over time — 1% per month? 5% per month? — and how maintaining a certain batch turnaround time will affect overall response time.

According to van Kinsbergen, coming up with a set of software tools that integrates the three levels of capacity management is a natural evolution of the company's current line of performance-reporting products "designed to make the world safe for systems programmers."

Targeted for IBM users, the "level one" products include Data Set Organizer (DSO), Control/IMS, Control/IMS Realtime and Control/CICS.

As for levels two and three, "We're trying to go through the make-or-buy decision. Do we go forward with a major development effort or take advantage of software that already exists?" van Kinsbergen remarked, adding, "Our target market is any IBM customer with a 370/158 or larger system running VS1 or MVS."

Noting that some of B&B's existing customers have already developed software to gather certain second- and thrid-level capacity-planning data, he said these are application-specific solutions and have to be expanded to be of general use in the marketplace.

B&B is also open to joint arrangements with other companies that have capacity management skills beyond its own expertise. The firm, for example, has no operations research personnel working with predictive performance models, so, "we'll have to acquire that expertise," van Kinsbergen explained.

Book Covers Project Control

OAK BROOK, Ill. — Applied Information Development, Inc. has released a "Project Manager's Handbook" aimed at improving productivity, quality, timeliness, cost and overall user satisfaction in application software development projects.

The handbook covers:

- The standard development life cycle.
- Stringent project control.
- A set of quantitative phase checklists.
- Cost estimating and change control.

The handbook is centered on two principles: The cost to make change and fixes in application software increases dramatically as the life cycle advances. Second, a major source of problems is the gap between what users expect and what DP delivers.

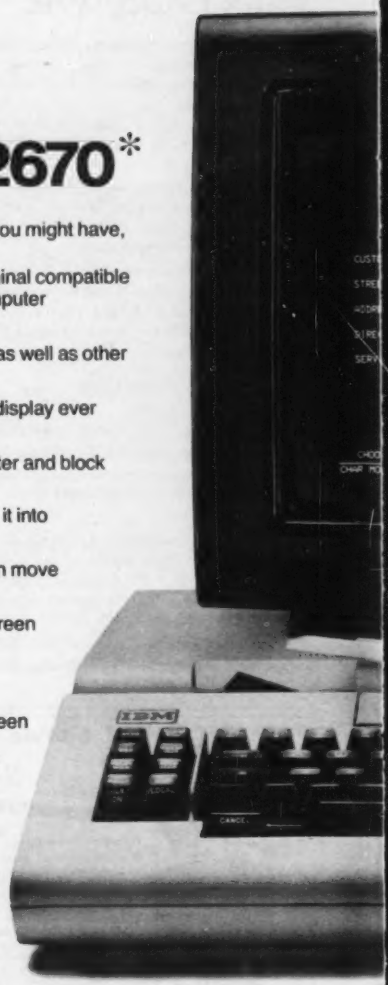
The book is available for a one-time fee of $9,000 or on a time payment plan from 823 Commerce Drive, Oak Brook, Ill. 60521.

Do the 1

CALL 800-431-2670*

First you ask us any questions you might have, such as these:

1. Is the IBM 3101 Display Terminal compatible with both IBM and non-IBM computer systems?
2. Can I use it for time sharing as well as other remote computing services?
3. Is this the most economical display ever offered by IBM?
4. Does it come in both character and block transmission models?
5. Can I easily set it up and put it into operation by myself?
6. Is it light enough so that I can move it around?
7. Can the 12-inch diagonal screen be swiveled or tilted to cut interference from overhead lighting?
8. Can I switch quickly from green characters on a black background to black on green?
9. Is it simple to change line speed, parity, scroll, and other functions?
10. Is there a printer available to capture a hard copy of what I see displayed?



*In New York call 800-942-1918.

The IBM 3101 ASCII terminal, priced

From 1978 Sigplan Conference

ACM Offers Tapes on Languages

NEW YORK – The Association for Computing Machinery (ACM) is offering audio and video cassettes of presentations given at its 1978 Sigplan History of Programming Languages Conference.

The cassettes present key people involved in the early technical development of 13 programming languages. The 1978 seminars discussed the factors that influenced the creation of these key languages.

Included in the tapes are Alan Perlis and Peter Naur discussing Algol, Kenneth Iverson on APL, Douglas Roth on APT, Thomas Kurtz on Basic, Jean Sammet on Cobol, John Backus on Fortran, Geoffrey Gordon on GPSS, Charles Baker on Joss, Jules Schwartz on Jovial, John McCarthy on Lisp, George Radin on PL/I, Kristen Nygaard and Ole-Johan Dahl on Simula and Ralph Griswold on Snobol.

In addition to cassette programs on the individual language seminars, ACM is also offering a two-hour presentation including excerpts from all sessions. Other combination packages are available, ACM said.

Audio tapes cost between $9 and $202 depending on which sessions are chosen.

Video tapes of the same sessions cost between $45 and $1,158, ACM said from 1133 Ave. of the Americas, New York, N.Y. 10036.

Prime Aid Out

SCRANTON, Pa. – Computer Techniques, Inc. has announced PMS-IV, a system management package for Prime Computer, Inc. users.

The package is said to provide easily formatted data entry updates, along with a report writer and an ad hoc inquiry facility that provides plain English inquiries.

PMS-IV, which costs $9,600, can be used with Prime's Primos and Midas operating systems. It is compatible with all Prime languages, the vendor said from 1015 N. Main Ave., Scranton, Pa. 18504.

ASCII two step

IBM
CUSTOMER SERVICE SYSTEM
NORTHEAST REGION FAST ACTION OFFICE
Jones, Franklin Q
495 NAME Technical TYPE Regular
Highview Blvd Research Park
Enter third door from the left in rear
01 SEMORAH NORTH APPARTMENTS 5573 SEMORAH BLVD
02 SHEHAN CONDOMINIUMS 284 LONDON ST
03 SOCIETY PARK APARTMENTS 1670 SEMORAH BLVD
04 SORRENTO HEIGHTS 723 SORRENTO AVE
05 SPANISH OAK APARTMENTS 17650 BROADWAY
06 ST JOHNS VILLAGE GREEN 9589 OXFORD ROAD
07 ST JOHNS VILLAGE GREEN 9591 OXFORD ROAD
08 SOCIETY PARK APARTMENTS 1672 SEMORAH BLVD
LOCAL

2

SEND THIS ORDER FORM

When you mail us this form you can get delivery within 45 days.

IBM Data Processing Division
National Marketing Center, Dept. 86-R
1133 Westchester Avenue
White Plains, NY 10604

IBM Data Processing Division

Yes, I wish to order IBM 3101 Displays and IBM 3102 Printers specified below for delivery as soon as possible. I understand that a 15-day trial is available for the first five IBM 3101's and the first five IBM 3102's only, and that this offer, including the prices shown below, is subject to change without notice until order confirmation. I have read and signed the Outline of Terms of Purchase on the reverse side.

QUANTITY	INTERFACE	UNIT PRICE*
	IBM 3101 Display – Character Models	
___Model 10	RS-232C point to point	$1295
___Model 12	RS-232C point to point/20MA current loop	$1320
___Model 13	RS-232 & RS-422 point to point	$1320
	IBM 3101 Display – Block Models	
___Model 20	RS-232 point to point	$1495
___Model 22	RS-232 point to point/20MA current loop	$1520
___Model 23	RS-232 & RS-422 point to point	$1520
___Model 01	IBM 3102 Printer	$1295
	ACCESSORY	
___	Modem Cable	$65

*Volume discounts available. Prices shown exclude applicable taxes and shipping charges.

See reverse for Outline of Terms of Purchase

Name and Title_____

Company_____

Address_____

City_____ State_____ Zip_____

Phone_____

Ship to: (if different)

Name & Title_____

Company_____

Address_____

City_____ State_____ Zip_____

ORDER FORM

as low as $1,295. Give it a try for 15 days.

Forecasts, Models, Reports

SAS Provides Econometric Aid

CARY, N.C. — SAS Institute, Inc. has introduced a software package for forecasting, modeling and reporting. The Econometrics and Time-Series Library (SAS/ETX) is said to offer products ranging from automatic, easy-to-use procedures to advanced statistical techniques.

Included in the SAS/ETX procedure library is the forecast procedure, suitable for forecasting hundreds of variables, according to the firm.

The modeling procedures handle financial and econometric models, and include capabilities for estimating parameters, generating predictions and performing policy simulations.

The Computab procedure organizes data into a tabular form and prints row-and-column reports.

SAS/ETS licenses for $1,500/year with a $500 annual renewal fee to corporate customers. For educational customers, the prices are $500/year and a $300/year renewal fee. Government users pay $1,250/year initially and $500/year to renew, according to SAS, Box 8000, Cary, N.C. 27511.

IT'S EVEN EASY TO READ THE FINE PRINT

Outline of Terms of Purchase.
IBM 3101 and IBM 3102 Machines.

PRICES & TERMS

The prices shown on the order form on the reverse side (Order Card) and these terms are subject to change until IBM confirms your order in writing (order confirmation). At that time, you will be given the full terms governing this purchase including any changes to the prices and terms shown here. In the event of any change, you may cancel the order within 10 days without liability by written notice to the DPD Marketing Center. Otherwise, the prices and terms provided at the time of confirmation will apply to this order.

Payment is due 15 days after the Date of Installation. The Date of Installation of the machines is deemed to be two days after the date of receipt by the Customer. In addition to the purchase price of the machine, the Customer agrees to pay all applicable taxes and shipping charges.

INSTALLATION

The Customer is responsible for unpacking, checking out and setting up these machines.

TITLE AND RISK OF LOSS OR DAMAGE

The title to each machine passes to the Customer on the Date of Installation. Up to and including the Date of Installation, the risk of loss or damage will be borne by IBM. Thereafter, risk of loss or damage will be borne by the Customer.

15-DAY TRIAL

The Customer may order the first five IBM 3101's and the first five 3102's on a 15-day trial basis. If, for any reason, the Customer is not satisfied with these machines, the Customer may return the machines and pay only shipping charges to the Customer's location. To return the machines, the Customer must notify the DPD National Marketing Center within 15 days from the Date of Installation and pack the machines in their original shipping cartons. IBM will arrange for their return to IBM.

WARRANTY

IBM warrants that each machine will be in good working order on the Date of Installation and that it will conform to IBM's official published specifications.

For three months commencing on the Date of Installation of each machine, IBM agrees to provide at no additional charge to the Customer, warranty service at an IBM Repair Center to restore the machine to good working order.

DETAILS OF THIS WARRANTY, AND EXCLUSIONS FROM WARRANTY SERVICE, WILL BE PROVIDED AT THE TIME OF ORDER CONFIRMATION.

SHIPMENT

IBM will provide the estimated shipment schedule for this order in writing at the time of order confirmation. IBM reserves the right to amend the estimated shipment schedule as necessary.

INFORMATION ON PATENT INDEMNITY, LIMITATION OF REMEDIES AND OTHER GENERAL PROVISIONS WILL BE PROVIDED AT THE TIME OF ORDER CONFIRMATION.

I have read the above and understand that my order is subject to prior credit approval, that the full terms governing my order will be sent with IBM's confirmation letter and, that unless notified otherwise, shipment will be made within 45 days of receipt of order.

AUTHORIZED SIGNATURE _____ DATE _____

NAME (Please print or type) _____ PHONE _____

IBM
Data Processing Division

ORDER FORM

System Manages Sports Events

SEATTLE — Distributed Data Products, Inc. is offering a Ticket Manager System for sports organizations.

The turnkey system manages season ticket requirements and reportedly can simultaneously handle up to 99 events along with day-of-game sales.

The Ticket Manager System is capable of handling a 65,000-seat sports facility. It costs $88,800 from the vendor at Suite 600, 419 Occidental Ave. S., Seattle, Wash. 98104.

Graphics Tool Fits Most CPUs

BOULDER, Colo. — A machine-independent, device-independent graphics software development system is available from Precision Visuals, Inc.

The DI-3000 offers features for developing graphics applications, including full-color 3D, area fill and patterning, graphic arts quality text, snapshot debugging and a picture library (Metafile).

Current implementations of DI-3000 on Digital Equipment Corp. PDP-11, -11/780 and VAX CPUs and on IBM, Control Data Corp., Harris Corp., Prime Computer, Inc. and Burroughs Corp. processors are examples of the system's machine-independence, the vendor claimed.

Licenses for the system start at $8,000 including one year of maintenance and updates, the vendor said from 1518 9th St., Boulder, Colo. 80302.

Fortran 77 Compiler Debuts

FORT LAUDERDALE, Fla. — Modular Computer Systems, Inc. has announced a Fortran 77 compiler for its Classic series of systems using the MAX IV operating system.

The compiler conforms to a full Ansi X3.9 1978 standard, Modcomp said. The compiler will also offer extensions to support MIL STD 1753 and ISA S61.1 standards; MIL STD 1753 provides END, DO, DO WHILE, INCLUDE and IMPLICIT statements.

The firm will continue to offer its current Fortran compiler — Ansi 1966 base — for users of existing software.

The Fortran 77 compiler will be available the first quarter of 1981 and will cost $4,000 from the vendor at P.O. Box 6099/1650, W. McNab Road, Fort Lauderdale, Fla. 33310.

Micro Bytes

Apple Pilot is a high-level programming language system that reportedly facilitates computer-aided instruction for educators and corporate and industrial trainers; it runs on the Apple II and Apple II Plus MPUs. Cost: $2,785. Vendor: Apple Computer, Inc., 10260 Bandley Drive, Cupertino, Calif. 95014.

North Star Packages Fit Business Tasks

BERKELEY, Calif. — North Star Computers, Inc. is offering three integrated business application software packages for general ledger, accounts receivable and accounts payable to users of its Horizon microcomputer.

Each package, written for the first-time business user, can stand alone or be used in combination with the other packages, the firm said.

General Ledger

The general ledger package includes a financial reporting feature allowing users to define dollar precision, use multiple columns, define sub- and grand-totaling and carry totals forward to other statements.

The accounts payable package allows users to establish and maintain up to 1,500 vendor accounts and includes flexible controls for printing checks, remittance notices and reports.

The general ledger package costs $499; the accounts receivable and accounts payable packages cost $599 each.

Further information is available from local North Star dealers. The firm is headquartered at 1440 Fourth St., Berkeley, Calif. 94710.

Magic Wand turns CP/M-based MPUs into word processors. Price: $4,000 to $6,500. Vendor: Occupational Computing Co., Inc., 22311 Ventura Blvd., Woodland Hills, Calif. 91364.

Key Realty Management System works on Radio Shack TRS-80 and CP/M-based micros. Price: $2,500. Vendor: Key Systems, Inc., 16 Ocean East, Marathon, Fla. 33050.

Visicalc, which turns a personal computer display into an "interactive electronic worksheet," will soon be available for the Commodore Business System, Inc. Pet and Model 8032 and the Atari, Inc. 800 micros. Price: $199.95. Vendor: Personal Software, Inc., 1330 Bordeaux Drive, Sunnyvale, Calif. 94086.

Data Manager Works With Apple Micros

OKLAHOMA CITY, Okla. — A data manager for use with Apple Computer, Inc. microcomputers features the ability to do calculations, totals and subtotals, according to its vendor, High Technology, Inc.

Information Master is said to let the user define, enter, edit, sort and retrieve data. The user can define printed report formats using the report generation features of the package, according to the firm.

A program is included that transfers files from the data base management system for use with the Information Master, he added.

Information Master costs $150. High Technology, Inc. is headquartered at 8001 N. Classen Blvd., P.O. Box 14665, Oklahoma City, Okla. 73113.

TSO EXPLOSION

50% Maximum Number of Users

47% Number of Logons

41% Average Number of Users

32% Terminal Connect Hours

These were the *increases* experienced in just one year for systems maintained in our TSO Performance Data Base.

The reaction to these figures from TSO installations worldwide has been surprise and concern because this kind of growth, if unplanned, can adversely impact hardware, service, and staff.

If you don't like costly surprises, write or call us today and we will show you how our *TSO PERFORMANCE STATISTICS* publication and our TSO/MON program product allow over 350 installations to plan for, and control the TSO explosion.

mma

Morino Associates, Inc.
7980 Gallows Court
Vienna, Virginia 22180
(703) 734-9494

Please send me information about the ***TSO PERFORMANCE STATISTICS*** publication, the ***TSO/MON*** product, and the ***TSO EXPLOSION CHART.***

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____

Telephone _____

Morino Associates, Inc.
7980 Gallows Court • Vienna, Virginia 22180
(703) 734-9494
TELEX NO. 248659

XCW

'Assist' Geared To VM/370 Installations

TOWSON, Md. — A VM Cobol Assist for VM/370 installations doing interactive development or maintenance of Cobol programs is available from Improved Programming Technology Corp.

Assist creates an intelligent editor that "knows" DOS/VS Cobol syntax and has the capability to verify syntactic correctness as existing edit commands are used to enter or modify program lines, the vendor claimed.

The product also features an edit command that allows the whole program (or any part) to be checked without the process of having to leave the editor, perform a compilation, record errors and reenter the editor.

Assist is licensed annually for $225/mo per CPU, the vendor said. More information is available from P.O. Box 19064, Towson, Md. 21204.

Finance System Fits Bank Use

NEEDHAM HEIGHTS, Mass. — McCormack & Dodge has unveiled an on-line General Ledger Financial Analysis System for banks, bank holding companies and mortgage service companies.

GL Plus-Banking provides on-line access to account information and efficient journal entry features to ensure trouble-free closings, the vendor claimed.

Banking operation reports such as teller errors, trial balances by branch, account reconciliations, budget reporting, allocations and balance sheets can be integrated into the user's required format and content through the use of three report writers.

The system costs between $49,000 and $75,000, depending on features, the vendor said from 560 Hillside Ave., Needham Heights, Mass. 02194.

Graphics Added to Rapidata Net

FAIRFIELD, N.J. — Rapidata, Inc. has added Graphics, an interactive, keyword-driven language to its time-sharing network.

The package can be used to prepare production-quality plots, charts and graphs. Formats available include point plots, line plots, spike graphs, bar graphs, histograms, pie charts, ring charts, pictographs, staircase curves, spline interpolation and straight line regressions, the vendor said.

In addition, the user can specify design options such as shading or cross-hatching between data points, offset axes, alternate character sets, logos, user-defined symbols and multiple colors used.

Rapidata is based at 20 New Dutch Lane, Fairfield, N.J. 07006.

Programmers Offered Tool For Testing, Debugging

SAN JOSE, Calif. — Xpediter, a testing and debugging productivity system for programmers, is available from Applicon Development Systems, Inc.

The system monitors all aspects of the test in anticipation of program errors, the vendor claimed. When errors are encountered, facilities are available to capture relevant program information, analyze the failure and then isolate the problem.

In creating a test sequence, external and internal values can be initialized, including program storage contents, input record areas, parameter values and register contents. In addition, a series of instructions, labeled procedures or callable modules, whether coded or not, may be simulated, a spokesman said.

Xpediter is priced between $25,000 and $35,000, the vendor said from 1530 Meridian Ave., San Jose, Calif. 95125.

Library Debuts For PDP Users

STERLING, Va. — A library of data management routines for Digital Equipment Corp. PDPs and LSI-11s operating under RT-11 or RSX operating systems has been announced by Berman Associates.

Omniprog reportedly allows user-written programs to retrieve and update information that is compatible with the firm's Omnidata interactive data management system.

Omniprog carries a license fee of $495. Omniprog users must also be licensed for Omnidata.

Berman Associates is located at Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

NEW COMPLETE SCHEDULE SEPT. 15 THROUGH DEC. 17, 1980

Meet today's economic challenges.
Improve your skills and productivity at these

Datapro Seminars

Invest a few days now and profit before year end.

Keep current with the latest techniques, tools and ideas in the information processing industry.

COMPLETE LIST OF COURSES	New York	San Francisco	Chicago	Washington	Los Angeles	Atlanta/Dallas/ Denver/Houston
1 **Data Communications:** An Introduction to Concepts and Systems	Sept. 15-17 Dec. 1-3	Sept. 29-Oct. 1	Nov. 5-7	Oct. 27-29	Nov. 17-19	Dec. 8-10 DENVER; Sept. 22-24 HOUSTON
2 **Data Communications:** Advanced Concepts and Systems	Dec. 4-5	Oct. 20-21	Dec. 11-12	Oct. 16-17	Dec. 11-12	Oct. 6-7 DALLAS
3 **Data Communications:** Effective Network Design	Sept. 15-17	Dec. 8-10	Oct. 6-8	Nov. 10-12	Oct. 29-31	Nov. 19-21 HOUSTON
4 **Introduction to Teleprocessing Software**	Nov. 19-21	Nov. 5-7	Oct. 20-22	Oct. 8-10	Dec. 8-10	Sept. 22-24 DALLAS
5 **Distributed Systems:** Effective Approaches and Applications	Nov. 5-7	Oct. 29-31	Sept. 24-26	Oct. 1-3		Dec. 10-12 DALLAS
6 **Systems Analysis and Design:** Concepts and Effective Practice	Dec. 15-17	Sept. 22-24	Sept. 15-17	Oct. 22-24		Nov. 19-21 DALLAS; Dec. 8-10 DENVER
7 **EDP Project Management:** A Practical Approach	Sept. 22-24	Oct. 6-8	Dec. 8-10	Nov. 17-19		Dec. 15-17 DALLAS
8 **Data Base Management Systems:** General Concepts and Planning Guidelines	Sept. 15-17	Nov. 10-12	Sept. 29-Oct. 1	Nov. 17-19	Dec. 15-17	
9 **Data Base Management Systems:** A Comparative Analysis of General Purpose Systems	Sept. 24-26	Nov. 19-21	Nov. 5-7	Dec. 15-17		Oct. 15-17 ATLANTA
10 **Minicomputer Systems:** Guidelines For Successful Selection, Acquisition and Operation	Sept. 29-Oct. 1	Oct. 27-29	Oct. 8-10	Nov. 12-14		Dec. 15-17 DALLAS
11 **Advanced EDP Management:** Methods and Techniques in the 80's	Nov. 10-12	Dec. 15-17	Oct. 29-31	Oct. 1-3		
12 **Data Processing:** An Introduction to Concepts and Systems	Sept. 15-17	Nov. 10-12	Oct. 22-24	Dec. 8-10		Dec. 15-17 HOUSTON
13 **EDP Operations Today:** Effective Scheduling and Console Operation	Dec. 10-12	Oct. 15-17	Nov. 10-12	Oct. 29-31		
14 **Effective Computer Operations Management**	Dec. 15-17	Oct. 27-29	Sept. 15-17	Oct. 22-24		Nov. 19-21 ATLANTA; Dec. 8-10 DALLAS
15 **Computer Performance Measurement:** Tools and Techniques for Increased System Productivity	Sept. 15-17	Nov. 17-19	Oct. 27-29	Dec. 15-17		
16 **Introduction to Word Processing:** Concepts, Systems and Applications	Oct. 29-31	Oct. 1-3	Oct. 20-22	Sept. 15-17 Dec. 15-17		Nov. 12-14 DENVER
17 **Word Processing:** Effective Operations Management	Nov. 10-12	Nov. 19-21	Oct. 29-31	Sept. 29-Oct. 1 Dec. 8-10		Dec. 15-17 HOUSTON
18 **Integration of Word Processing and EDP Systems**	Oct. 15-17	Nov. 12-14	Oct. 1-3	Nov. 19-21		Oct. 29-31 DENVER
19 **Automating Your Office Today:** Planning and Implementation Methods	Sept. 29-Oct. 1	Oct. 6-8	Nov. 5-7	Dec. 8-10	Nov. 17-19	
20 **Electronic Mail:** An Overview of Concepts, Systems and Applications	Sept. 22-24	Oct. 22-24	Oct. 15-17	Dec. 15-17		
21 ***NEW*— Introduction to Micro/Personal Computers:** Application, Selection & Usage Guidelines	Nov. 12-14	Dec. 15-17	Sept. 29-Oct. 1	Oct. 8-10	Oct. 20-22	

FREE! 48-PAGE CATALOG with complete course outlines, schedules and details.

REGISTER NOW BY CALLING OUR SPECIAL, TOLL-FREE NUMBER 800-257-9406

In New Jersey, 609-764-0100. For catalog, instant enrollment or more information.

datapro Datapro Research Corporation 1805 Underwood Boulevard Delran, NJ 08075 A McGraw-Hill Company

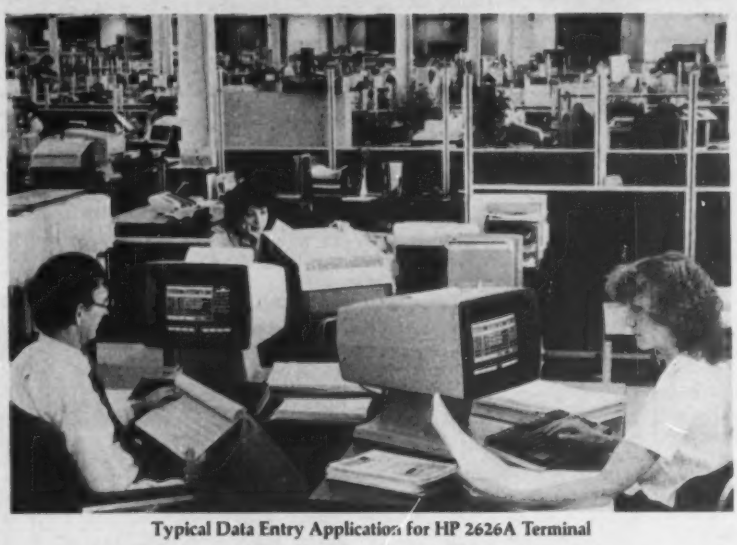
HP Terminal Screen Gives Four Windows

By Brad Schultz
CW Staff

PALO ALTO, Calif. — A montage of four work areas on the screen of Hewlett-Packard Co.'s latest data entry terminal, plus the ability to interact with two CPUs simultaneously, may open new vistas for users beset with diversified entry tasks and limited staff size.

HP's 2626A CRT terminal can go a three-ring circus one better. Four horizontally scrollable windows on its 6-in. by 8.5-in. screen can show 80 to 160 char. per line and any combination of lines per window within the screen's 1,920-char. capacity.

HP's strategy is seemingly to offer as many resources per cubic inch in a single unit as most users can justify for sizable data entry or software development operations. The user can opt for an integral 60 char./sec forms printer that pumps 8.5-in. wide paper out of the 2626A's top, bearing 132-column lines when font is compressed, expanded print for larger characters and either 60 or 64 lines per page in report mode.



Typical Data Entry Application for HP 2626A Terminal

Two Ports

The terminal's two communications ports permit simultaneous interaction with two computer systems or one system and an external RS-232C serial printer. According to an HP spokesman, data may be displayed by or passed through the 2626A en route to a local printer. And data may also be routed to a computer in block, line, line modify or character modes.

Line modify mode allows the operator to employ the terminal's editing capabilities while running character mode applications on the linked CPU, the spokesman explained.

Both RS-232C and 20mA current loop interfacing are available, he continued, and the 2626A offers point-to-point and asynchronous or synchronous multipoint capabilities as well as full- and half-duplex operation, handshaking and expandable buffers up to 2K bytes.

The terminal runs at from 110- to 9,600 bit/sec and is reportedly able to copy a full screen of data on the optional printer within 18 seconds. Besides the 24 lines reserved for displaying up to four windows of data, the HP peripheral features 25th and 26th lines for labeling of function/softkeys or message/status lines.

The operator can define the functions for each of the eight softkeys and display labels for each function with two lines eight characters long. Software running on the host system can redefine and relabel the keys as needed, the spokesman said.

Audio cues add music for this four-ring circus. HP provides a software program by which the user can assign tones of sound — at up to 15 separate pitches, 16 different durations and two volume levels — to serenade the operator when conditions such as certain keystroke foibles arise.

Finally, the 2626A has several levels of self-testing, including a "power on test" that covers workability of the terminal's basic components, tests of data communications and the optional printer.

With eight-week availability, the 2626A CRT terminal starts at $3,950. HP's address is 1501 Page Mill Road, Palo Alto, Calif. 94304.

Legal Tug-of-War Continues Over Termination of Telpak

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — The future of Telpak remained up in the air last week in the wake of a recent decision by the U.S. Court of Appeals allowing AT&T to terminate the service provided it supplies specified information to the Federal Communications Commission (FCC) [CW, July 7].

Aeronautical Radio, Inc. (Arinc) and the Air Transport Association (ATA) were among the Telpak users asking for reconsideration of the court's decision and for continuation of the present, restricted Telpak service until the reconsideration process is completed.

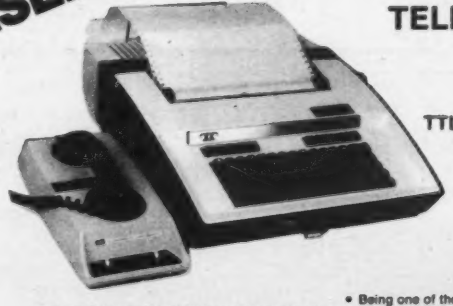
MCI Telecommunications Corp., which regards Telpak as unfair competition, said the decision should stand as is. AT&T asked for more time to prepare the information demanded by the court and also requested reconsideration of the decision, while the U.S. Department of Justice sought more time to prepare a petition for reconsideration.

The object of all this legal maneuvering is a service AT&T has been offering since the early 1960s, which grants hefty rate discounts to bulk private-line users. In 1976, the FCC found that the rates were anticom-

(Continued on Page 50)

WE'RE SO EXCITED
WE'RE BESIDE OURSELVES

ADD A TECHTRAN 950/ 951 MICRO DISK and WOW WHAT POWER!



TELETYPE 43

TTL $39.00 MTH
w/EIA $45.00 MTH
w/AJ 243 Coupler $54.00 MTH
Call for Details

Other Products
- Texas Instruments 745, 765, 820, 810, 733
- Vadic Modems & Couplers
- DEC LA-34, LA-120, VT-100, LA-36
- Lear Seigler ADM 3A, ADM 31 ADM 42

NEW VT52's LA180's DIABLO 1650 IN STOCK READY TO SHIP

NATIONAL COMPUTER Communications Corp.
The Greatest Name in Terminals
260 West Avenue, Stamford, CT 06904

- The Teletype Model 43 has proven to be so reliable that National Computer is taking the bold step of offering the Teletype 43 WITH maintenance but, NOT CHARGING FOR IT.
- The above rates are for 1-year leases. Beyond 1-year, you may keep it or return it. If you keep it, it's MONTH-TO-MONTH. NEVER is a renewal necessary at National Computer.

- Being one of the largest distributors of Data Communications Equipment We:
  a. Have inventories to provide rapid deliveries - YOU DON'T WAIT (in most cases)
  b. Have full service depots in major offices - WE GET IT RUNNING FAST!!!
  c. Offer a full range of terminals, modems, accoustic couplers, peripherals AND full support to go with them.

Call:
Boston: (617) 444-6822
Fairfield Area: (203) 357-0004
New York Area: (212) 354-9866
New Jersey: (201) 843-3800
Chicago: (312) 296-0830
TOLL FREE 800-243-9006
IN CONN. 203-357-0004

Net Geared to Test Environment

CONCORD, Mass. – Genrad, Inc. has introduced its 2291 GRnet network, which it claimed is the first network designed specifically for the automated test equipment (ATE) production test environment.

The network provides the link through which a Genrad 2290 Multiuser Programming Station can communicate with any Genrad in-circuit test system, functional test system or programming station on the manufacturing floor, the firm said.

The 2291 can accommodate up to 64 systems on a single line. With a 2290 functioning as a host processor, all systems in the network can call for test files from the central disk storage.

Programming or editing functions from production systems can also be off-loaded via GRnet, the firm said.

Basic Components

The three basic components of the 2291 network are the Network Interface Module, which manages all communications functions for the CPU of each test system; the connecting cable, a part of coaxial cables that can be driven up to 2,000 ft by the GRnet network; and the GRnet system software which, according to the firm, is almost transparent and can accommodate keystroke commands from the test systems' high-level monitors.

Transfer Rate

The network transfers data at a raw rate of up to 655,000 bit/sec. The typical throughput rate is approximately 40,000 bit/sec, Genrad said.

Up to four transfers can be simultaneously executed while the same throughput rate is maintained, according to a spokesman.

The 2291 GRnet costs $10,000 for the license, hardware and software for connecting to the 2290 programming station. Each additional connection to test systems and programming stations is priced at $5,000, the firm said from 300 Baker St., Concord, Mass. 01742.

Drivers Run Multidropped

NORWALK, Conn. – A series of asynchronous line drivers which can be connected in a multidrop configuration is available from Tri-Communications Industries, Inc. (Tri-Comm).

The ALD-I and ALD-II drivers were designed to provide data transmission over twisted-pair wire for terminal-to-computer, terminal-to-terminal or computer-to-computer communications.

The ALD-I's ability to operate in a multipoint environment reportedly reduces cable runs and computer ports required when using other line drivers or limited distance modems.

The ALD-I costs $185 and the ALD-II costs $215, Tri-Comm said from 20 Fitch St., Norwalk, Conn. 06855.

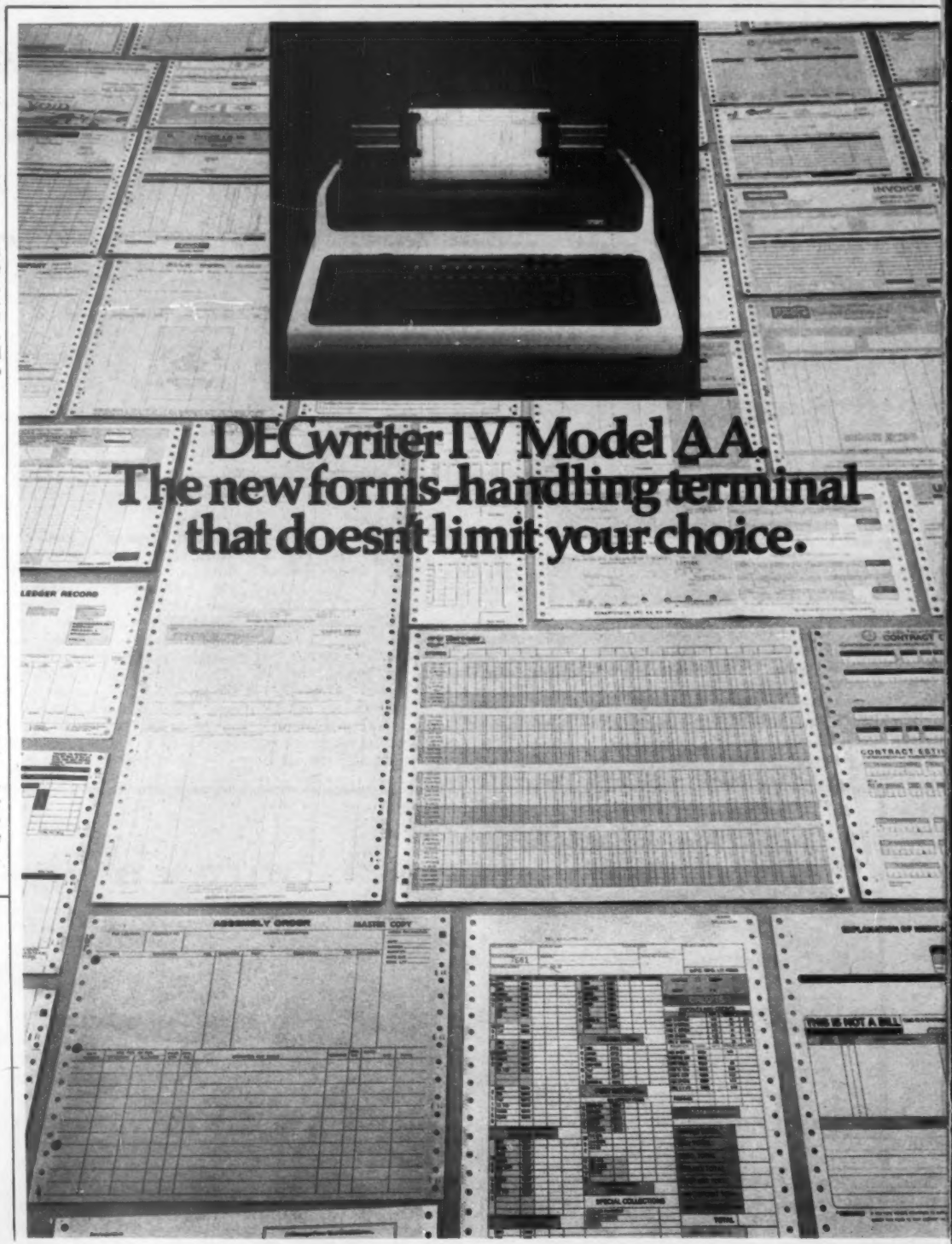
Modem Line Fits Short-Haul Use

CHATSWORTH, Calif. – Micom Systems, Inc. has unveiled a modem series for short-haul data transmission. The Micro 400 Local Dataset family includes both line drivers, designed for use over customer-owned twisted-pair cable, and local data sets for use over private-line metallic circuits supplied by the telephone company.

The local data sets meet the requirements of Bell Publication 43401, which defines specifications for operation over metallic circuits. Both synchronous and asynchronous models are available.

Prices start at $190 for asynchronous models and $290 for synchronous models, the vendor said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

ABSOLUTELY FREE. . .
world-class dbms & query language with qualified Hardware purchases and leases.
Combines best features of IMS/DL1, ADABAS and CODASYL types like IDMS to reduce program and file maintence burdens, and simplify transaction oriented design and programming.
PRIME 150's thru 750's at discount prices, competitively priced IBM mainframe leases, plus best DB software money CAN'T buy.
ONLY from OMNIBASE Corporation!
201-224-3535



CRT Terminal Implements Most of Ansi X3.64-1979

ANN ARBOR, Mich. — A CRT terminal that reportedly implements most of the Ansi X3.64-1979 standard has been introduced by Ann Arbor Terminals, Inc.

The Ambassador operates in keyboard send/receive (KSR) or block mode and features editing, erasure, cursor movement and transmission commands, according to a company spokesman.

Setup Mode allows the user to select transmission rates from 110- to 19.2K bit/sec, the spokesman said.

The terminal's memory is 60 lines of 80 characters; the display format is selectable from the keyboard or the computer, ranging from 18 to 60 lines.

The D-Case version of the Ambassador costs $1,430. The desktop unit is also available in a more compact E-Case version, which is also available in a rack-mounted configuration. The basic E-Case costs $1,300, with delivery for both in eight to 12 weeks from 6175 Jackson Road, Ann Arbor, Mich. 48103.

The Ambassador

Terminals Compatible With IBM 3101, DG 6052

RALEIGH, N.C. — Perry Data Systems, Inc. has unveiled a line of compact Ascii terminals that are compatible with IBM 3101 and Data General Corp. 6052 devices.

The 9800 series terminals are available in both intelligent and nonintelligent versions and were designed to be used in areas where office space is at a premium.

The terminals incorporate the firm's PDS9800 CRT display which can produce 1,920 characters in 24-lines on a 9-in. green phosphor tube.

The nonintelligent IBM 3101-type terminal costs $1,395, while its intelligent brother sells for $1,695. The intelligent DG6052-compatible model costs $2,190, and its nonintelligent counterpart is priced at $1,895.

Perry Data Systems is located at 3401 Spring Forest Road, P.O. Box 58535, Raleigh, N.C. 27658.

Penril Adds 4800 DCM

ROCKVILLE, Md. — A diagnostic-controlled modem (DCM) that provides data transmission at 4,800- or 2,400 bit/sec over multipoint, point-to-point leased or general switched networks has been introduced by Penril Corp.'s Data Communications Division.

The 4800 DCM has internal diagnostic features that function as the controller of the user's communications network, checking on the status of the system. The unit conforms to CCITT Recommendation V.27 and has an eight-phase differential modulation at 4,800 bit/sec and a four-phase differential modulation at 2,400 bit/sec, a spokesman said.

The modem design is said to provide a 110 bit/sec secondary channel for diagnostic modes to test and control the remote-site modems without interfering with mainstream transmissions.

Available both domestically and internationally, the modem costs $2,910 for the basic configuration, $3,600 for the master site configuration and $3,340 for the remote-site version.

Penril is located at 5520 Randolph Road, Rockville, Md. 20852.

You probably know the DECwriter IV for its flexibility in handling paper.

Well, now you can have that same flexibility in handling forms.

The new DECwriter IV Model AA with its snap-in tractor feed option can automatically handle both standard and custom forms. Forms as wide as 14⅞". And as narrow as 3". In up to four parts.

And you can control this new terminal either directly from its keyboard or from a computer.

With the DECwriter IV Model AA you can condense characters down to 16½ per inch. Or expand them up to 5 per inch. On a field of 132 horizontal and 84 vertical tabs. And a simple setting also lets you super-condense lines down to 12 per inch. So you get more information per line, per form.

You can also be sure of synchronized printing from one form to the next, no matter what form you're using. Because with the DECwriter IV Model AA you program "top of form." And parity is easily selected at the keyboard, simplifying communication with other computers.

Simply remove the tractor feed option and the DECwriter accepts all your roll feed or sheet paper up to a width of 14⅞".

Of course the new DECwriter IV gives you switch-selectable 110 and 300 baud rates. And a 45 CPS catch up rate so you get the true 30 CPS throughput found on our original DECwriter IV Model DA. You also get the extra attention to features you expect from Digital. Like foreign character printing, super/sub-script capabilities, keyboard-selectable local echo, and a print head that moves aside when desired so you can see the last character printed.

Best of all, Digital has put all this capability into a terminal that fits right into a wide range of environments—either on its custom stand or on a desktop. And the DECwriter IV's solid-state components and microprocessor controls continue to build on the reliability standards set by the DECwriter II. All at a surprisingly low price.

The DECwriter IV Model AA. For real forms-handling capability, it's your only choice.

To order your DECwriter IV Model AA, or the original DECwriter IV Model DA, call your terminals supplier or write **Digital Equipment Corporation,** Terminals Product Group, MR2-2/M67, One Iron Way, Marlboro, MA 01752. In Europe: 12 av. des Morgines, 1213 Petit-Lancy/Geneva. In Canada: Digital Equipment Corporation of Canada, Ltd.

digital

Why Wait?

IBM 3101
Delivery NOW!
from $1195
-Leases Available-
CALL 617-261-1100
AMERICAN COMPUTER GROUP

Legal Tug-of-War Continues on Telpak's Future

(Continued from Page 47)

petitive.

The commission, at about the same time, also ordered AT&T to allow resale and sharing of its Telpak circuits.

The phone company, claiming the service would not be economically viable if offered on those terms, then obtained FCC permission to terminate it. But the users, realizing that the demise of Telpak would increase their communication costs significantly, went to court.

The upshot was a 1977 judicial ruling that ordered AT&T to continue offering Telpak temporarily, pending further court action, but no new customers could be signed up, and release and sharing would not be required.

Last month, the appeals court found that the commission should not have authorized termination of Telpak. The reason: the phone company had failed to submit economic data required by Section 61.38 of the FCC's rules.

But the decision allows termination once the data is provided. AT&T was given a total of 120 days to complete the termination process. However, because of a 90-day advance notice required by the FCC's rules, AT&T was required to submit its documentation on or before July 24.

The phone company, in its petition to the appeals court, asked for another 40 days to prepare this material. Furthermore, the phone company wants the present resale and sharing restrictions extended accordingly — i.e., for a total of 160 days from June 24, when the appeals court issued its Telpak verdict.

MCI strongly opposes continuation of the resale and sharing restrictions beyond 120 days, as specified in that decision. "If there should be a 40-day gap [between the lifting of the restrictions and the termination of Telpak], parties who now obtain private-line circuits from AT&T in sufficient quantity to qualify for Telpak discounts, but who did not quality in [1977], will receive the benefit of these discounts," MCI told the court.

Actually, the company probably is worried less about extension of the resale and sharing restrictions for an additional 40 days, as requested by AT&T, than about the much longer extension requested by Arinc, ATA and other users who want the status quo maintained until their petitions for reconsideration are disposed of — a process that could take months or years.

"Competing carriers such as MCI, who have been frozen out of the big-user segment of the market by predatorily low Telpak rates for years, should be permitted at least to get the benefit if such discount with respect to the circuits they buy from AT&T for resale," the company added.

FDC Plan

Underlying the users' objections was a contention that the FCC committed a series error when it decided, in 1976, that Telpak rates were anticompetitive because they were not based on "fully distributed costs" (FDC). This is an accounting scheme that would shift many of AT&T's overhead expenses from monopoly to competitive services — thereby making life easier for Bell's competitors but more expensive for Telpak users. The users indicated that if the court does not reconsider last month's decision, it will be compounding the FCC's error.

There is some support within the court for this view. The Telpak case was decided on a 2-1 vote; the dissenter, Judge Malcolm R. Wilkey, felt the commission had "assumed FDC prices to be necessary to prevent cross-subsidies" without considering other implications.

"This is probably the most important rate case which has ever been reviewed by this court," Arinc and ATA said.

DISASTER!
CAN YOU AFFORD IT?

Flood, fire, tornado, sabotage, earthquake — no area of the country and no business is immune to natural or man-made disaster.

The tragic fallout of Mount St. Helen and the chaotic riots in Miami brought this into sharp focus recently. The computer technology that helps run businesses in these areas was found to be vulnerable to such sudden and devastating disasters. Today, in the age of computers, very few businesses are immune to this potential for catastrophe.

HOW CAN YOUR COMPANY SURVIVE?

Anything less than an immediate and planned response to such calamities could put your company out of business, perhaps permanently. The Institute of Internal Auditors, Inc., recognizes the need for disaster preparedness by corporate and EDP management. The IIA wants to help and is bringing together a select group of authorities on a subject which has few experts. Members of the planning team at Levi Strauss and Barnett Banks of Florida will tell you how their organizations prepared disaster plans. Experts from International Security Technology, Coopers & Lybrand, and Devlin Associates will speak on a range of topics concerned with disaster planning and then will join you in workshops, industry breakout sessions, and panel discussion.

THE IIA DISASTER RECOVERY AND CONTINGENCY PLANNING CONFERENCE
Mayflower Hotel, Washington, D.C. September 8-9, 1980
PLAN TO ATTEND... AND PREPARE TO SURVIVE!

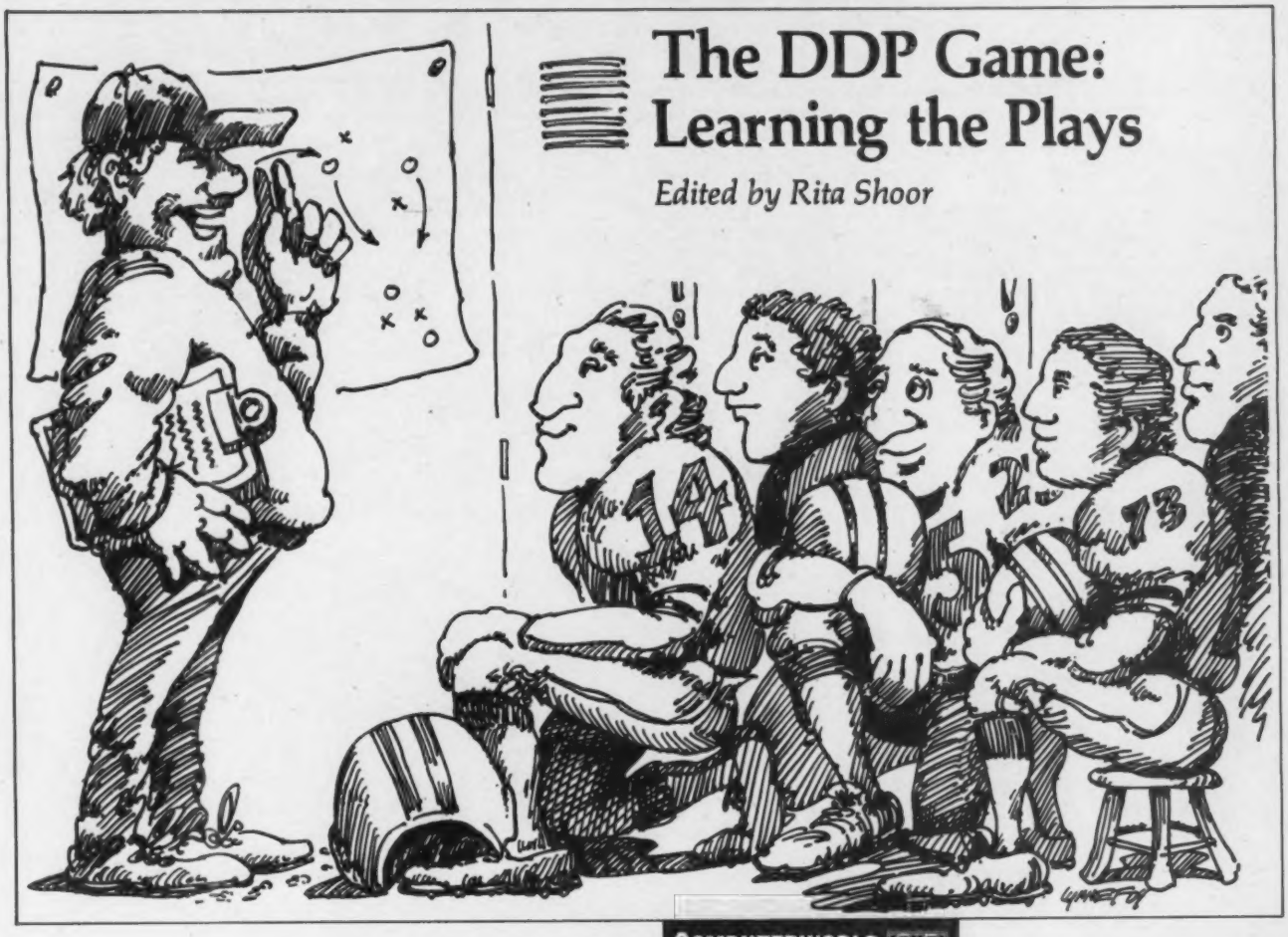
Send the team that ensures successful planning, including members from data processing, internal audit, and executive management. To register, call the Conference Registrar today at 305-830-7600. Don't miss out on this important and timely event to be held in our nation's capital. Remember . . . it can happen to your organization. Be ready for it!

THE INSTITUTE OF INTERNAL AUDITORS, INC.
249 Maitland Avenue Altamonte Springs FL 32701

AKD
VOLUME DATA ENTRY SERVICES
HOTLINE
for INSTANT QUOTES
OMAHA
(800) 228-9410
TWX 9106220199
AMERICAN KEY DATA
Mid America Plaza, Suite 144
7171 Mercy Rd., Omaha, Ne. 68106

July 28, 1980

SPECIAL
SPECIAL
SPECIAL
SPECIAL
REPORT



The DDP Game: Learning the Plays

Edited by Rita Shoor

COMPUTERWORLD

Survey Tallies DDP Hits, Misses in Top Firms

By John Gantz
And John Callahan
Special to CW

As the buzzword of "distributed processing" fades and the reality of distributed processing sets in, it becomes possible to establish an historical record — a tabulation of hits and misses.

To accomplish just such a tally, International Data Corporation (IDC) conducted a survey recently of 50 of the Fortune 100 top manufacturing firms. The study augmented and enhanced one on performance by IDC's "Distributed Processing Newsletter" (DPN) for its readers two years ago. In most cases, IDC talked to the communications or DP manager at a company; in 18 cases, it talked to the same person in the same company DPN queried two years ago.

Respondents to the study reported 45,000 terminals in service. Of those surveyed, 75% were adding to their existing distributed data processing (DDP) networks at annual rates of 13% or better (all terminals were not in DDP nets — many were straight teleprocessing). Compared to the 1977 study, the respondents showed fewer companies with extremely high growth rates, but more average growth overall. The annual terminal growth, in number of keystations, is expected to be 24% for the 50 companies.

Some other terminal-related matters surfaced:

- For many users, DDP growth can no longer be strictly equated with terminals, the users said. More software and better communications schemes increase DDP processing per terminal.
- The gross increase in terminals understates the activity, since many users are now replacing older terminals. The churn, then, must be somewhat above 25% a year.
- Some respondents could not project their terminal requirements even as short as one year out. These were primarily demand-oriented shops, where user requests were treated on an ad hoc basis.

DDP Planning

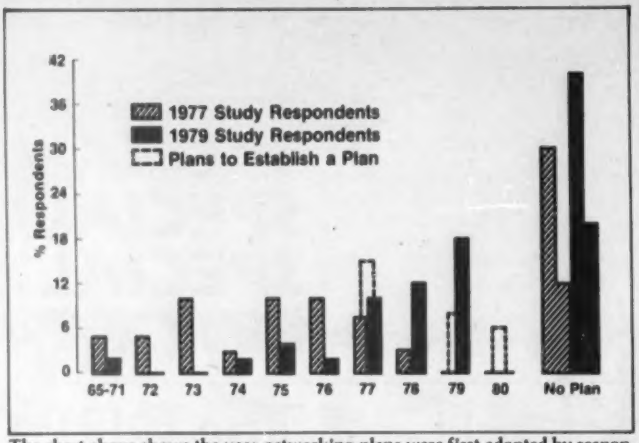
The number of companies that operate without some kind of formal plan for network growth has diminished by 10% to 30% of the respondents in the intervening years between surveys. Furthermore, 60% of those without plans expect to have them before long.

In a majority of cases, DP centers are looked at as support organizations — cost, and not profit, centers. Most planning activities, therefore, consist in trying to meet the load projections handed down by the end users, with costs being an important but secondary matter.

Users also appear to be setting up methods for continual equipment evaluation — some going so far as to have in-house experts, or communications consultants, perform this task, while serving as an interface between DP and management staffs.

For the most part, the users said, network plans were updated yearly and DDP applications were approved on a case-to-case basis by company management.

Within the survey sample, 20 companies said they had DDP up and running. This was a slight increase in the total number of DDP applications reported in 1977, but true penetration is actually deeper — almost all the users said they had some sort of distributed data base. In the earlier study, there was a preponderance of distributed data entry and distributed report generation.



The chart above shows the year networking plans were first adopted by respondents — and clearly the latter years have been pivotal. Under the "No Plans" category, the lower level of each bar represents those who don't expect to have formalized networking plans within the foreseeable future.

The users also reported some high-powered DDP equipment, such as the bigger units from Datapoint Corp., Digital Equipment Corp.'s superminis and even two IBM 8100 installations. Users who were not installing DDP were generally geographically or organizationally unsuited (highly centralized).

As for future plans for DDP, the presence of the IBM 8100 can be seen. Of 21 companies that have future DDP applications planned, nine say they will use the 8100. Some even appear to have ordered their 8100s first and are now casting about for applications (DPN, September 1979).

Of those who already have installed DDP, 60% say they plan more applications, often with specific applications in mind. Those planners of DDP who have not already got an application up and running are a little less specific — most suspect they will go to DDP, but are planning it in stages.

To see how well DDP has fulfilled its promise, IDC went back to the 18 users it had talked to in 1977 and compared them with the recent results. In 1977, seven out of 18 companies said they had DDP systems in place, nine had plans for systems in the future and two had no plans for implementation.

In the intervening years:

- One of the seven DDPers dropped out.
- One of those with "no plans" implemented DDP.
- Of the nine with plans for DDP, four implemented it and five still have plans for DDP.

The statistics are slim, but the insight may be meaningful. It appears that the lines have been drawn at large companies. Those with inclinations to go to DDP are doing so or have done so. There is less planned and more real distributed processing.

Of those users who have DDP (in the subset of 18), all but one plan more applications and more than 80% have specific applications in mind. And of those who do not plan more DDP — both those who have DDP and those who do not — most (80%) have specific applications in mind.

Part of the study that was not included in 1977 was investigation into the interface between DDP management, voice sytems management and office systems planning. Some interesting figures surfaced:

- Almost three-quarters of the respondents said their data communications systems shared lines with voice traffic, but less than half were under joint management.
- Of the companies that shared management of voice and data, a majority had been doing so for more than five years, and 40% had been doing so for more than 10 years.
- Of the respondents, 60% said their data communications staffs were involved in office systems planning.

In Review

If the survey of the Fortune 100 companies tells us anything, it is that DDP is here to stay and, for the big companies, anyway, the highest part of the learning curve is past. The whole DDP arena is more stable.

For smaller companies, the writing is on the wall. DDP will come, if it is not already there. IDC studies into the uses of data bases on minicomputers indicate that some of the more interesting DDP applications are beginning to appear at the smaller companies. DDP is past the leading-edge.

For DDP to remain robust, some problems will have to be solved, none closely related to equipment:

- Easy-to-use software for communications and distributed data bases will need to be developed.
- The acquisition, training and motivation of qualified people will have to be put onto an organized basis and made top priority.

The IDC report from which this story is taken is *"Networking and DDP in the Fortune 100."* More information is available from Mary Trayte, IDC, 214 Third Ave., Waltham, Mass. 02254.

John Gantz is director of publications for IDC and editor of "Distributed Processing Newsletter."

John Callahan is an independent consultant specializing in small systems and DDP.

Inside

Survey Tallies DDP Hits, Misses in Top Firms SR/2
Users, Vendors Growing Smarter About DDP SR/3
A Glossary for DDP Users SR/6
DDP Opens Spectrum of Management Options SR/7
DDP a Melding of Corporate, End-User Needs SR/10
Users Advised on DDP Chargeback Procedures SR/14
Offloading Lets Insurer Halve Processing Time SR/15
Backup Can Prove Obstacle, Networks Users Say SR/18
What's Holding Some Users Back From DDP? SR/19
Users Taking Various Approaches to DDP Security SR/20
IBM 4331 Seen Problematical in Some Nets SR/22
Distributed Minis Let Brewer Avoid Upgrade SR/24
Farmers' Co-op Reaps Better Grain Accounting SR/27
Manager Cities Continuity as Primary Issue SR/30
Distributed System Speeds Welfare Benefits SR/31
DDP Users Rate IBM Compatibility Important SR/32
Network Eases Health Service's Growing Pains SR/34

As Market Tops $2 Billion/Year

Users, Vendors Growing Smarter About DDP

By Ellen Rogers
And John Gantz
Special to CW

The buzzword is losing its glamour. Editors no longer salivate at the thought of articles on it, conference chairmen no longer consider it the foremost leading-edge topic. So what's happening?

Simple. "Distributed processing" is becoming so much a part of daily DP fabric that buzzwords no longer apply. It's real. Users are no longer just curious — they are cruising (or struggling) into second and third generations of distributed data processing (DDP).

A status report is in order, a retrospective.

We start with the market. Derived from subsets of the market for minicomputers, small business computers and processing (intelligent) terminals, the DDP market hit $2 billion installed base this year. By 1983, it will be an impressive $12 billion. In terms of processors at operating nodes within DDP networks, by year-end 1983 there will be about 220,000 in the U.S.

By 1983, system shipments will account for about 85% of total shipments of more than $4 billion worth of equipment to the U.S.; the rest will be add-on equipment. Processors by then will be gushing forth at about 100,000 a year just to the U.S.

At that point, the DDP market will have surpassed the "knee of the curve" in its shipment growth. Shipments and installed base, now of considerable size, could double every three years or faster. By the end of the decade, surmises International Data Corp.'s (IDC) *Distributed Processing Newsletter*, the installed base could include more than one million devices worth more than $70 billion (in 1979 dollars).

No wonder the buzzword is losing its punch. There's too much of substance behind it now.

DDP Management

How has DDP management changed as DDP users have gained experience?

To answer this question, IDC conducted interviews with all the major vendors and conducted in-depth research at 25 large organizations in their DDP implementations. The user survey was structured this way:

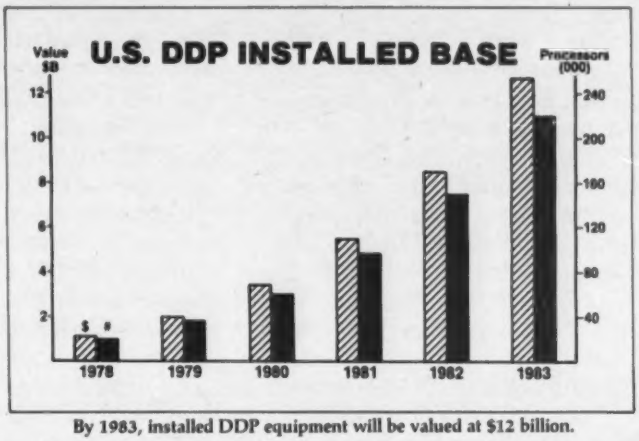
- The 25 organizations were known DDP users.
- The companies were in five broadly defined industry groups.
- Representatives of three of four functions within each organization were interviewed.

In fact, the last point revealed that since IDC had last conducted a similar study several years ago, *there was a new DDP-related function in most companies — a DDP/end-user Liaison.* In cases where talking to the vice-president of management information services (MIS), the DP manager and the end user had covered the subject, a new person was quite often involved. Although coming under various titles, this new function apparently sprung up in the last few years as DP's method of interfacing with end users. It is a function of translation between DP and the ultimate user of DP's products.

In its research, IDC found four major elements in the successful implementation of DDP systems:

- The decision-making process must be established and adhered to *before* DDP systems are designed or implemented.
- Equipment selection and usage must be carried out in a rational manner with an eye toward future growth, flexibility and service.
- Applications development must be carefully planned and only as ambitious as equipment and training permit.
- Education and support for implemented systems and users/-programmers are key to long-term success.

In the decision to go with DDP, users told IDC, control of operations, cost savings and mirroring corporate philosophy were all major driving forces.



By 1983, installed DDP equipment will be valued at $12 billion.

In the latest study, however, a new force emerged — increasing productivity, or leveraging personnel costs.

It's not surprising.

Studies by the Brookings Institute indicate that annual productivity gains in the services sector of the Gross National Product — which is heavily white collar — have averaged only half that for manufacturing, a third of that for agriculture.

Other figures reported by IDC indicate that white-collar workers have shown an increase in productivity of only 4% during that last decade, while factory workers' productivity has increased 80%, primarily as a result of higher capital investment per worker in the latter category.

The Brookings Study has also shown that almost 45% of what productivity gains there have been are related to technological innovation; a third of that is directly traceable to the usage of computer power. DDP, then, can be seen as an application of computing power to an area most susceptible to productivity increase.

Equipment Selection, Usage

Users (and their liaisons) are getting more involved in equipment selection. This reflects their growing sophistication, a yearning for autonomy and vendor marketing. (IBM, for instance, has begun marketing the 8100 to end users, and even the 4300; traditionally, IBM salesmen called only on DP managers.) And as DP managers have found out, not only do users' equipment needs change and evolve, so do their *perceptions* of needs.

Of particular interest — because vendors are pushing the concept so much — are multifunction systems for DDP use.

Users at the 25 companies told IDC that for now they need only a few of the various functions vendors are offering in single systems. In the future, however, they'll be in the market for more.

Oddly enough, despite the current mania for office automation and the heavily laden bandwagon of DDP suppliers that offer word processing (WP) with their products, few *DDP users* consider either word processing or message handling very important. In the future, there will be moderate interest.

The reason is probably organizational. Word processing is done under the aegis of another department; for DPers, it's a separate capability that is only "nice to have." Since the vendors are plugging it — and since office automation appears to be heading that way — by the mid-1980s, more DDPers will probably be taking advantage of the WP features on their equipment. In fact, DP managers might have a lot to say about WP networks.

Oddly enough, despite the current mania for office automation and the heavily laden bandwagon of DDP suppliers that offer word processing with their products, few DDP users consider either word processing or message handling very important. In the future, there will be moderate interest.

Education, Support

While education is a major factor in the success or failure of any DDP implementation, IDC's user interviews revealed a general lack of organization and planning when it came down to disseminating knowledge. Some users said they learned the system by "osmosis." Others taught each other. Sometimes training manuals were written by DP staffs, in others by user departments. And in general, the higher echelons in the company taught the lower ones — often with some "information lossess" along the line.

As a result, DDP-using companies are rethinking their education processes. Three levels of training seem appropriate:

- *Conceptual* — awareness of the rationale behind a DDP system.
- *General Implementation* — how the system will affect the company and specific job functions.
- *Actual Usage* — for those who will actually interface with the system on a day-to-day basis.

Successful DDP users have found that a three-tiered — and well-defined, somewhat formal — training program leads to the best result. It's especially important that end users receive some sort of indoctrination into the first two levels, even though they don't "need to know" on a day-to-day basis. Knowing the concept behind the system helps eliminate resistance to change and allows systems' end users to make more meaningful decisions in their daily interfacing with the system.

It's also important that there be good in-house marketing of the concept, which dovetails with the highest tier of training.

From the vendor's side of the house, the first method of increasing educational levels for DDP users would be to design easy-to-use systems in the first place. Second to that, an understanding of the three levels of training that are involved in user education is necessary; and then, good off-site or in-house programs to familiarize users with the equipment.

Support is also important. Here, everyone gets involved. There must be an overall corporate philosophy regarding training and vendor relations, and money must be allocated. There must be high-level DP management and plenty of non-DP management support for the system. There must be vendor support for hardware and software — a major factor in equipment selection.

While education is a major factor in the success or failure of any DDP implementation, IDC's user interviews revealed a general lack of organization and planning when it came down to disseminating knowledge. Some users said they learned the system by "osmosis." Others taught each other.

Overall comes the message from this IDC study — users and vendors are getting smarter about DDP. Vendors realize they must be prepared to meet increasing demands from users, while being patient as user perceptions of need evolve.

John Gantz is director of publications for IDC and editor of Distributed Processing Newsletter.

Ellen Rogers is IDC's manager of distributed processing studies.

TANDEM NonStop™ PATHWAY

NOW ON-LINE'S AS EASY TO PROGRAM

On-Line Programming—25 to 50% cheaper. User developed on-line applications packages just got a whole lot easier. And better. Not to mention 25 to 50% cheaper. We've eliminated all the time-consuming grief of dealing with terminal handling characteristics for one. And not incidentally, there's even greater protection in data base integrity, too.

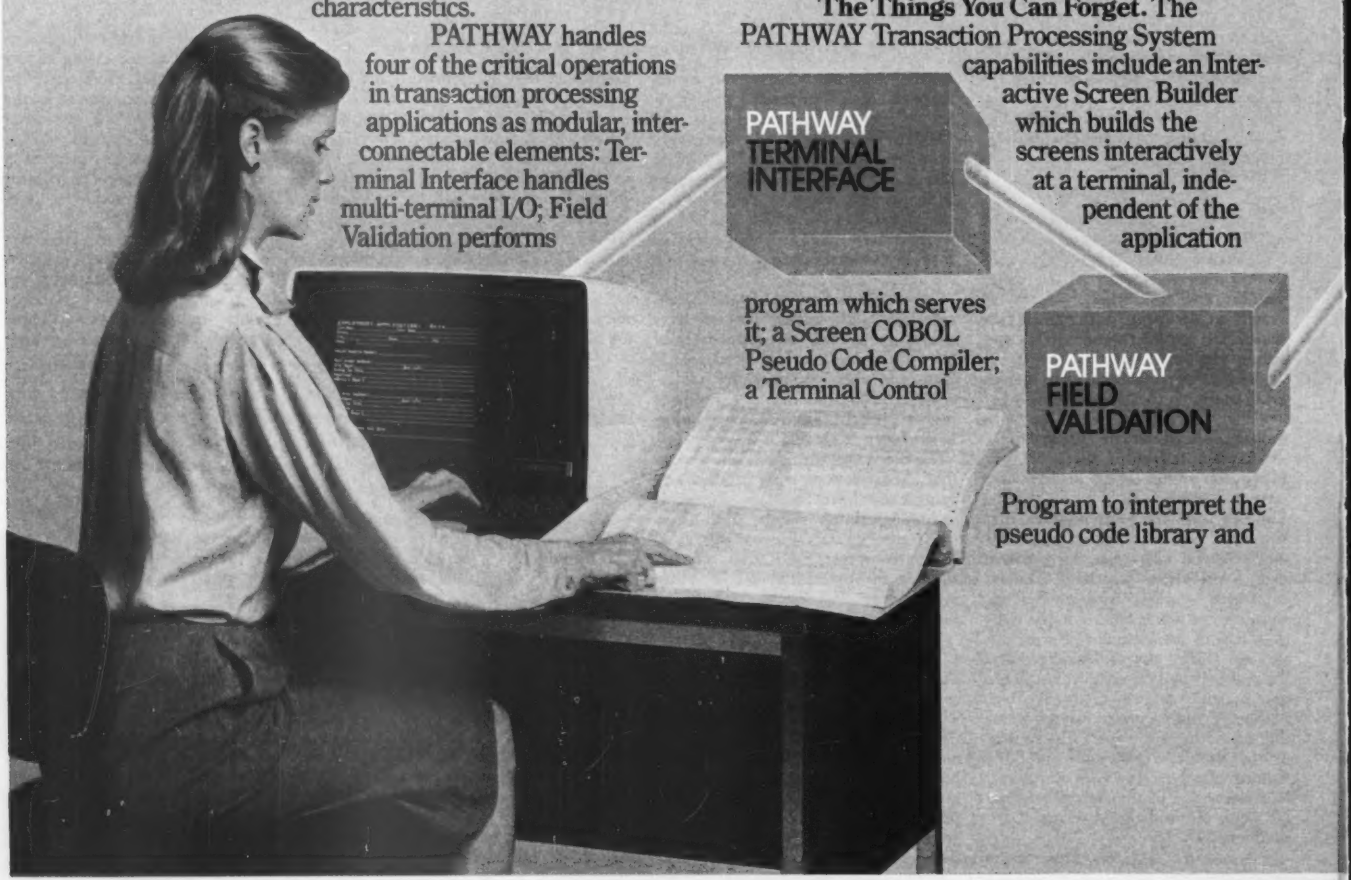
PATHWAY has all the programs, procedures and structures you need to get your applications up and running, in NonStop™ operation, in record time. Inexpensively.

Terminal Independent Applications. By taking the on-line programming task on in component parts rather than attacking it as an all-encompassing, monolithic whole, PATHWAY software makes the transaction processing system job relatively simple, and frees the application programmer from concern over terminal characteristics.

PATHWAY handles four of the critical operations in transaction processing applications as modular, interconnectable elements: Terminal Interface handles multi-terminal I/O; Field Validation performs data consistency checks; Data Mapping controls data conversion and formatting; and Transaction Control covers application and transaction flow. Each resource is partitioned, with well-defined interfaces between them. This is the secret to a modular systems' success. It allows optimized utilization of all the resources and permits additional resources to be dovetailed into the system as needed—without rewrite, without redesign and without degrading system performance.

We Speak Your Language. When it's time for the fifth operation—interaction with the data base—a Data Base Application Program can communicate in any of the languages available on the Tandem NonStop™ System: industry standard COBOL, FORTRAN, MUMPS, or our own transaction-oriented language, TAL, all facilitated by Tandem ENSCRIBE to interact with the Data Base management capabilities.

The Things You Can Forget. The PATHWAY Transaction Processing System capabilities include an Interactive Screen Builder which builds the screens interactively at a terminal, independent of the application program which serves it; a Screen COBOL Pseudo Code Compiler; a Terminal Control Program to interpret the pseudo code library and



AS BATCH.

check the flow and content internally; the Applications Monitor which has power to create, track and alter the application run time environment; and finally the Application Monitor Control Language which lets an operator communicate with an active Application Monitor. It's a powerful system, easy to use and inexpensive. With everything you need to get your on-line transaction applications up and running, with all the benefits of a NonStop™ System, in record time.

Dynamic Load Balancing. It comes from taking logical advantage of the multiprocessor environment. There is no need for the programmer to consider load balancing with the PATHWAY Transaction Processing System. It's handled automatically; with additional copies of PATHWAY applications started in designated CPUs as needed. And deleted when no longer required. Dynamic load balancing—built into the system's resource management capabilities.

And PATHWAY software also takes full advantage of the unique multi-page storage capabilities built into our new 6520 terminal.

Because terminal mapping translates physical into logical characteristics, programmers can forget about code signal conversions and call on terminals by name. And there's one more major advantage of the PATHWAY Transaction Processing System: one system can be used for convenient development, testing and production of application packages.

The Tandem NonStop™ System. Even when it wasn't this easy, it was miles ahead in the on-line world. With immediately available alternatives in all hardware and software elements, the NonStop™ System can go right around any failed element and never skip a beat. Even when a failure occurs in a processor, an I/O Channel, a disc, or a disc controller. Remarkable.

This is the one system in the world which lets you start with only the computing power you need right now and add as your needs grow, in low cost modular elements. From an entry level two processor system, you can go to sixteen processors with thousands of terminals and not lose one cent on your original investment.

Protection From Loss. Because of its unique parallel operation at all critical points, no transaction in process is ever lost or duplicated. The data base and programs in operation can be readily duplicated, hence completely protected from damage or destruction.

For Complete Information. Call or write for a demonstration of our unique capabilities, and for the name and address of your local Tandem sales and service representatives, domestic and international.

TANDEM

Worldwide Headquarters: Tandem Computers, Inc.,
19333 Vallco Parkway, Cupertino, California 95014
TOLL FREE 800-538-3107 or (408) 725-6000 in California.

A Glossary for DDP Users

WALTHAM, Mass. — In the world of information systems technology, new terms are constantly being coined in order to describe evolving concepts like distributed data processing (DDP).

Honeywell, Inc. has developed the following glossary to define the terms commonly encountered in its distributed systems environment. While this list represents only one vendor's definitions, it could apply to many DDP environments and may be helpful to the reader who is inundated with technical literature describing various systems and components.

Application — A definable set of tasks to be accomplished as part of the work of an enterprise. An application may be accomplished partly through manual procedures and partly through computerized procedures.

Application Program — A set of statements defining those tasks associated with an application that are to be executed by the computer.

Architecture — A framework or structure which determines how something is constructed, defining modularity and interfaces among modules.

Communications Network — The collection of transmission facilities, network processors and so forth that provides for data movement among terminals and information processors.

Concentration — The function of routing information from a number of communications links onto a smaller number of higher capacity links and providing the reverse flow from fewer to more links. A device which performs this function is usually called a concentrator. Unlike a multiplexer, the concentrator is a programmable device.

Data Base — A generalized, integrated collection of enterprise- or installation-owned data which fulfills the data requirements of all applications that access it and which is structured to model the natural data relationships that exist in the enterprise.

Decentralized Information System — Two or more sets of information-processing equipment, operated by the same enterprise, but without any implied coordination among the sets.

Distribued Data Base — One logical data base which has been divided between physical locations within a distributed information system.

Distributed Information System — A coordinated set of information-processing capabilities implemented in two or more relatively independent resource centers such as computer sites, terminal locations and so on.

Distributed Processing — A technique for implementing one logically related set of information processing functions within multiple, geographically separated physical devices.

Endpoint — The logical or physical entity at the end of a branch of a network. Endpoints include application processes, terminals and people at terminals.

File — A named increment of storage or an unstructured or user-structured form of data storage.

Hierarchically Distributed Processing — The distribution of functions over components connected in a tree-structured hierarchy. Also called "vertically distributed processing."

Horizontally Distributed Processing — The interconnection of two or more components which cooperate in an essentially "equal-partner" relationship.

Host — An information processor which provides supporting services and/or guidance to users and/or satellite processors, terminals and other subsidiary devices. A host processor is generally assumed to be self-sufficient and to require no supervision from other processors.

Hybrid Distributed Processing — A combination of hierarchically and horizontally distributed processing.

Information Network — Geographically dispersed resource centers, including information processors and terminals, which are interconnected using data communications facilities.

Link — The interconnection between two nodes in a network. A link may consist of a data communications circuit or a direct channel (cable) connection.

Load Leveling — Resource sharing which results in optimum use of resources at all locations.

Message — A collection of data to be moved as a logical entity within an information network.

Message Switching — Computer-controlled transfer of messages from a terminal to other terminals.

Modem — A device that provides an interface between a terminal or a processor and the data communications facilities.

Multiplexing — The support on a single physical link of two or more logical links. A device which performs this function is usually called a multiplexer. Unlike a concentrator, a multiplexer is not programmable.

Network Processing — The physical and logical operations which support the definition, establishment and use of facilities for data movement among physically separated locations.

Network Processor — A computer devoted to the control of data communications facilities, performing functions such as routing, switching, concentration, line/terminal control and host interfaces.

Node — An endpoint of any branch of a network, or a junction common to two or more branches of a network. Distributed system nodes include information processors, network processors, terminal controllers and terminals.

Packet Switching — A mode of data transmission in which messages are broken into smaller increments (packets), each of which is routed independently to the destination.

Partitioned Data Base — A distributed data base which is created in the form of a number of nonredundant partitions, each located at a different processor.

Procedure — A series of operations performed in a regular sequence to accomplish a stated purpose. Procedures may be either manual or computerized.

Program — A collection of one or more computer-executable (directly or indirectly) procedures.

Protocol — A set of rules for the exchange of information between two or more components.

Replicated Data Base — A distributed data base which is created by copying all or part of a "master" data base and placing each copy at a different location within the distributed system.

Resource — An information-system component (hardware or software) which can serve a user requirement. Resources include processing time, storage devices, data bases and language compilers.

Resource Sharing — The function of allocating the processing load of an enterprise to the available processing facilities when multiple facilities exist.

Ring Network — A distributed system in which the information processors are connected via a circular arrangement of data communications facilities.

Routing — The function of selecting the appropriate path(s) for the movement of data within a network, ensuring that all data is directed to the appropriate destination(s).

Satellite — An information processor that is arbitrarily assigned a subsidiary role in a distributed system, communicating with (and perhaps depending upon, to some degree) a host for supporting services and/or guidance.

Schema — An explicit declaration of the interrecord and intrarecord relationship structures of a data base.

Site — A physical location for the housing of information-system equipment.

Star Network — A configuration in which remote terminals and/or processors are connected radially to a central processing location.

Station — A logical endpoint in an information network, such as a terminal, information processor or application program.

System — A collection of components which is under single, unified management.

System Administrator — An individual who defines, controls and manages the information system environment within which the activities of the enterprise are handled.

Terminal — A device which embodies a set of human/system interface functions, such as a teletypewriter or a keyboard/CRT device.

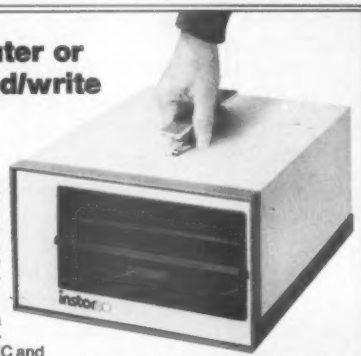
Terminal Controller — A hardwired or intelligent (programmable) device which provides detailed control for one or more terminal devices.

Transaction — An event (such as a sale, order or payroll change) of interest to the enterprise which controls the information system. Also, a computer-processable record of that event.

Transaction Processing —The entering of records of events into the information system when each event occurs. Generally, only relevant data is entered.

Now, any computer or terminal can read/write

IBM 3741 Floppy Disks



INSTOR/80 provides turnkey IBM 3741 capability for any system that supports an RS-232C asynchronous serial port. It automatically creates the world's most common and reliable flexible disk format!

INSTOR has software for a large number of systems, including HP's 3000 and 9825, DEC and DG, Intel and Radio Shack, Process Control Systems, OCR and Bar Code Readers, Word Processors and others.

Many users like to read our diskettes on their System 34, or other IBM hardware. Others just like transportable standard floppy disk media for different systems.

We may have interfaced your system already. If not, we'd like to. It's all included in the price. $3995 complete! Just call or write:

instor CORPORATION

175 Jefferson Dr., Menlo Park, CA 94025
(415) 326-9830; TWX 910-373-2036

VAX® & PACS™

...team up to solve your problem of Resource Management and Chargeback.

Signal Technology's Process Accounting and Chargeback System (PACS):

- Satisfies in-house, commercial and government contract audit requirements.
- Reports use of all system resources to help optimize configuration and chargeback rates.
- Reports current charges to users on-line.
- NEW! Software packages and non-standard devices can now be accounted ... plus many other features...

*VAX is a registered trademark of Digital Equipment Corporation

For further information, contact

SIGNAL TECHNOLOGY, INC.

15 WEST DE LA GUERRA • SANTA BARBARA, CA 93101 • (805) 963-1552

Centralized or Decentralized?

DDP Opens Spectrum of Management Options

By Grayce M. Booth
Special to CW

The information processing community is still in the early phases of an evolution in the use of distributed systems. This evolution is centered around the concept of distributing computing power and data storage to the places where the ultimate users of the system — the end users — are located.

This distributed system trend introduces many technological challenges. For example:

- Standard communications protocols are needed to allow data exchange across complex networks.
- Global cataloging and access procedures are needed to provide for the use of distributed data bases.
- Load-leveling and resource-sharing algorithms are required so that optimum use can be made of distributed resources.
- Systemwide restart and recovery procedures are needed to ensure that the distributed system can meet the uptime requirements of the application.

Management Challenges

However, of equal importance are the other challenges — and opportunities — which the management of distributed systems represents.

Distributed systems impact managerial philosophies and styles because their flexibility opens up a whole new spectrum of management options not available with centralized information systems.

Centralized computing implies centralized managerial control. Obviously, each user or user group cannot choose its own hardware, operating system and supporting software, nor can each group operate the computer system. A centralized information processing staff must perform these functions, leaving only the application programs to be defined by end-user groups or their representatives.

In this environment, the central staff must make appropriate trade-offs that best meet the needs of all user groups. Often, in practice, this means that no user's requirements are met fully because of the compromises caused by sharing. This disadvantage is typically offset by saving to the organization as a whole through economies of scale in equipment and staffing.

Fewer Advantages

Today the economic advantages of centralization have decreased, particularly when data communications and personnel costs are considered along with information processing equipment costs.

The cost of data communications facilities is either decreasing slowly (more slowly than computer hardware cost) or increasing, depending upon the geographic area and the type of service obtained. For example, in 1975, communications link cost in the U.S. averaged only 65% of the cost of the same service in 1960. However, according to International Data Corp. (IDC), increased use of these facilities has led to an escalation in total link costs for all U.S. users from an estimated $1,091,000 in 1974 to $1,945,000 in 1977.

In some countries, basic costs of communications links have increased. The cost of a voice-grade private link in the UK was approximately 40% greater in 1975 than in 1970. Other countries are experiencing comparable — or even greater — communications cost increases.

Personnel costs are constantly increasing, keeping pace with worldwide inflation. According to IDC, total salaries of DP personnel in the U.S. have increased from an estimated $8,044,000 in 1974 to $10,800,000 in 1977. Comparable personnel costs in the UK are growning at an annually compounded rate of about 15%.

Cost increases in data communications provide a strong incentive to distribute computer power in the hope of minimizing transmission costs. Personnel cost trends can only be offset through productivity increases, which may be achieved through more effective computer use.

Question of Control

As the distribution of processing and data bases becomes economically attractive, the question of managerial control arises. Should control remain centralized, even though the components of the information system are distributed? Or should control follow system structure and be fully distributed? Or is some compromise between centralization and distribution of control most appropriate?

Managerial control can be exercised independently over each of the following major functions: application development, data base administration and equipment selection.

Application development is an important aspect of control; whoever develops the programs determines how the system operates. Application development today ranges from centralized to distributed even in centralized systems.

Some organizations have chosen to maintain a single centralized analysis and programming staff which develops all application programs, in consultation with the user groups.

Other organizations have chosen to support an analysis and programming staff in each major functional area (such as personnel, production controler order entry), with necessary coodination provided by the central computing staff. Each of these patterns has proven successful in many installations.

These same choices exist in distributed systems. The major new factor is that application development applies to several information processors and/-or intelligent terminal/device controllers in multiple locations.

Hierarchical system

A typical hierarchically distributed system is shown in Figure 1. The central host processor serves as a focal point for consolidated reporting and headquarters-level activities such as budgeting. Each of the satellite (local) processors serves a different division of the organization, performing local processing functions.

With this type of system, some organizations may choose to centralize all

(Continued on SR/8)

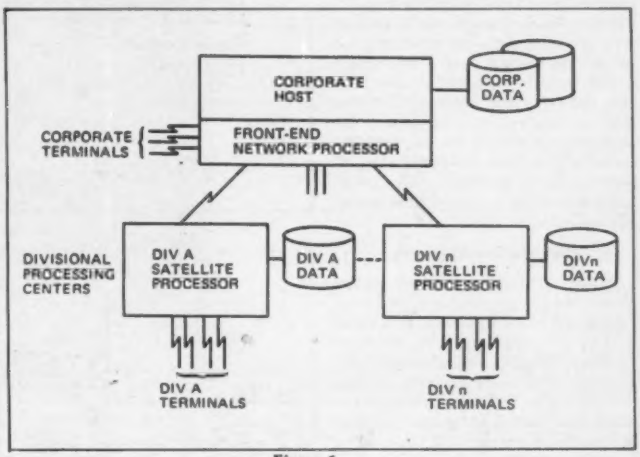


Figure 1

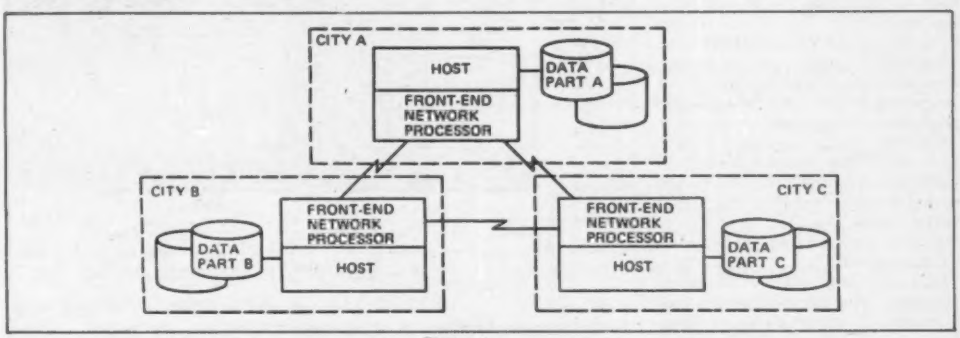


Figure 2

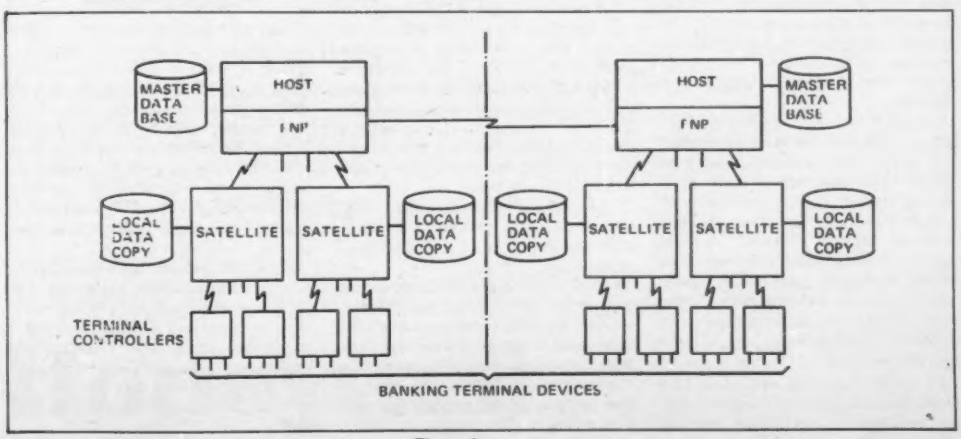


Figure 3

DDP Offers Management a Range of Options

(Continued from SR/7)

application development at the headquarters level. This is most easily accomplished if satellite programs can be developed using cross-compilers and tested, using simulators, on the host processor.

Centralized application development is chosen when management wishes to consolidate control and/or minimize cost.

Alternatively, an application development staff may reside at each host and satellite location, with responsibility for the programs to be used locally. This may be more costly in staffing, but may be more responsive to local needs, minimizing local end-user costs. In this case, cross-compilers, simulators and so on are not usually required.

Distributed application development, however, requires a coordinated set of interface protocols for information exchange. Even though each satellite may opeate semi-independently, it must send specific data — on defined schedules — to the host for consolidation and reporting. Similarly, the host may be required to send data to the satellites periodically. Although the remainder of the host and satellite implementations can be unique, these information exchanges must follow mutually agreed-upon rules.

Combination Approach

A large automobile manufacturer has chosen an innovative combination of centralized and distributed application development within one of its major divisions. This division operates a distributed system very similar to the Figure 1 example, with a host computer at divisional headquarters and satellite processors at remote plant locations.

Application programs that are common to all plants are developed at headquarters and sent to the satellite computer at each plant in object form. This avoids local program modifications and guarantees tight control over processing which must be consistent throughout the division.

However, local mangement at each plant may choose to maintain an application development staff. This combination of central and local control provides considerable flexibility to serve the needs of both headquarters and local management.

Data base administration is another important aspect of distributed system management control. Today's centralized on-line systems have been developed around large integrated data bases under strong central control. This control is exercised by a data base adminstrator (DBA) or by a data base administration staff if the data base is very large.

The DBA typically resolves conflicting requirements for data base content and access. For example, if an integrated data base serves both engineering and marketing organizations, compromises may be necessary. Engineering requires detailed drawing number information for each product, while marketing needs only major product data. In addition, each component may refer to the same product by a different identifier — one internal and one external.

To make the integrated data base workable, and provide a unified view of real-world conditions, realistic trade-offs must be made by the DBA.

In contrast to centralized control of an integrated data base, a distributed data base offers several choices for administration. An example of a distributed system with a distributed data base is shown in Figure 2.

This system includes a partitioned data base. The data partitions stored at all hosts collectively form the organization's data base, but each partition contains data unique to that location.

With this type of system, an organization may choose to assign a central DBA to manage the entire distributed data base. Local users at each site can request that certain data elements be maintained, but the DBA determines whether this is done. The DBA maintains all schemas and subschemas, perhaps creating and validating them at the nearest host and then transmitting them via down-line load to the remote locations for use there.

This approach retains tight central control over the partitioned data base and ensures that all of its elements are compatible.

As an alternative, the organization may assign data base responsibility to a DBA at each location. Each DBA then controls the local data base partition, by means of schema and subschema creation. Each data base partition can then be designed to best meet local needs.

In this case, certain coordination activities are required. For example, if data elements are to be moved between locations, compatible data descriptions must be used — or else data conversion procedures must be specified and implemented.

Close relationships among the data base partitions may require coordinated recovery routines to handle failure conditions. The DBAs must collectively provide the coordination and procedures necessary to cope with these situations.

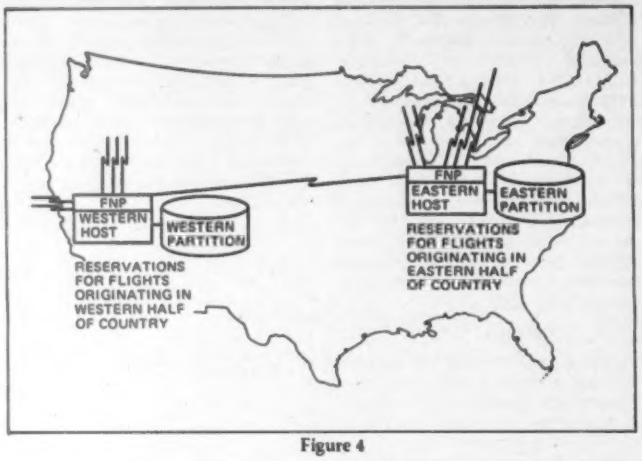


Figure 4

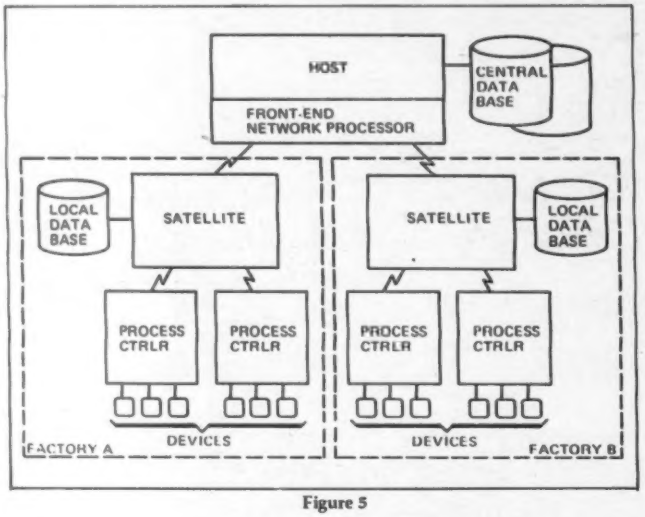


Figure 5

Equipment Selection

This selection function can be either centralized or distributed. Many organizations today require central, high-level approval for computer equipment procurements above a specified cost, leaving items below that cut-off to local discretion. Of course, this is one of the reasons for the current popularity of minis and micros, as these can often be purchased without authorization from central information processing management.

In a distributed system, a new dimension exists in equipment selection. Local equipment, hardware and software, must be interfaced to other local and/or central equipment. Compatibilty problems which are minimal with local free-standing processors become important with interconnected processors.

As the preceding discussions show, available managerial options range from total centralization of control to relatively complete decentralization. Total local autonomy, however, is impractical because certain standards must be defined and enforced to ensure that the distributed system's components can work together successfully.

Cost Factors

Cost is an important factor in choosing a management approach. However, this cost is not simply the cost of information processing equipment. The cost of the entire information system must be considered: computer and terminal equipment costs, data communications facilities costs, software costs (in-house and external), information processing department staffing costs and end-user staffing costs.

It is particularly important to evaluate end-user costs and the effect various system alternatives have on these costs. In any large on-line system that serves the main-line activities of a business, end-user costs tend to be much greater than computer equipment and staffing costs.

This aspect is often overlooked, because information processing people still think in terms of batch systems, in which computer costs far outweigh end-user costs. In on-line systems, including distributed system, opportunities to increase end-user productivity and reduce overall sytem costs should be explored.

Management Philosophy

The managerial philosophy of the organization can also affect the distributed system management approach.

Management philosophy in most large organizations favors decentralization, with each "local" manager assigned full profit and loss responsibility for that segment of the business. However, many decentralized organizations have adopted centralized computing philosophies because of the lack of an alternative. Distributed system technology is beginning to make it practical to distribute control to match the organization.

In general, therefore, an organization that favors decentralized management will tend to prefer this same approach in distributed system control. An organization that favors strong central management will generally retain centralized control of the information processing system, even when system components are distributed.

A large European bank is an example of the latter approach. This bank is currently installing a very large, complex information system, shown in Figure 3, with widely distributed processing.

However, the bank's philosophy is "distributed systems and centralized management." All of the software for the entire system, managing more than 8,000 teminals in more than 2,000 bank branches, is centrally developed, and the system is under central administrative control.

Nature of Application

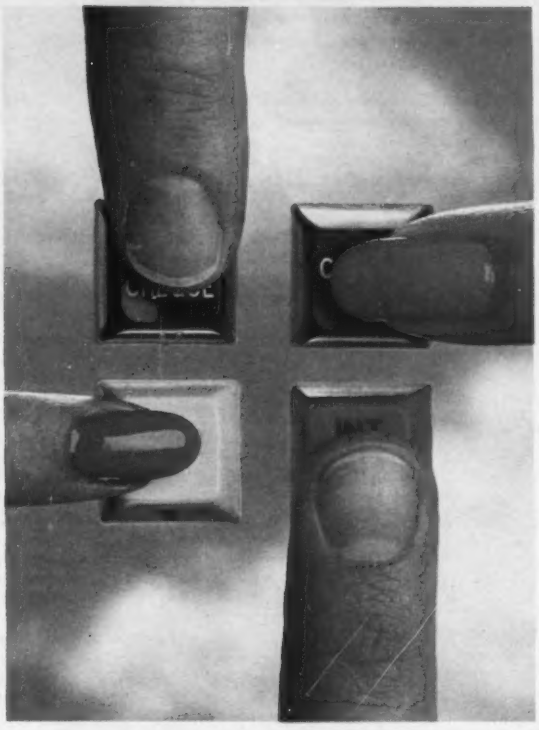
The nature of the application will often be the deciding factor in determining how to control a distributed system.

For example, it may be practical to

(Continued on SR/10)

DISTRIBUTED POWER.

Honeywell's new DPS 8/20 puts more remote processing power at users' fingertips.



The whole point of a distributed processing system is to have the right data in the right place at the right time. Right?

Well, that's what the Honeywell DPS 8/20 is all about. The smallest of the DPS 8 family of large-scale distributed processing systems, it's a cost-effective way to bring big processing power to more and more locations. It's another option between the large central computer and the minicomputer in a network. And it's another plus for Honeywell.

With its powerful GCOS operating system, it's a free-standing processor that can be used as a remote host to a series of Level 6 systems. You can use it to provide peak-load backup to a larger DPS 8 or Level 66 mainframe computer. Or use it to develop programs for the host computer and satellites.

It's compact, energy efficient, versatile, compatible, and available now.

You'll give it extra points for software flexibility. You can take advantage of the new GCOS 8 operating system, Data Management-IV (DM-IV) Transaction Processor, COBOL-74, and Integrated Data Store/II (I-D-S/II) Data Manager.

That's the DPS 8/20. It's small enough for specialized tasks, powerful enough for large-scale jobs, and a natural for distributed networks.

Your Honeywell representative can give you all the details. Or write: Honeywell, 200 Smith Street (MS 487), Waltham, Massachusetts 02154.

Honeywell

• *More Than the Sum of Its Parts*

DDP a Melding of Corporate Objectives . .

Special to CW

The concept of DP for most major U.S. corporations has developed along the following lines: centralized, decentralized and distributed.

In the first environment, all computer resources are centralized at a single location, and all requirements for DP services are then directed to that particular location. This permits the corporation to obtain an overall view of the data, but involves additional cost for communications between outlying regions and the central location.

In this case, there is usually a corporate DP organization to implement all systems on the centralized computer, and end-user needs are not always given high priority. This conflict is a result of centralized DP's view of the "corporate" needs vs. the user's view of the application needs.

Many organizations then moved to a decentralized approach, where computers were distributed among various geographic locations. Decentralization did lower communications cost and put the computer resources closer to the need, but, without a centralized coordinator for data, this approach increased costs for maintaining integrity of data and for summarization of data into information to answer corporate objectives.

Compromise – DDP

The concept of distributed data processing (DDP) was initiated as a compromise between these two approaches. There is a need to satisfy various user requirements for handling data at the time and place needed. There is also a requirement to reduce communications costs. And, there is the need to maintain a corporate identity and coordination within a computerized environment.

Thus, DDP has come about from a standoff between the corporate needs and the application or end-user needs for information.

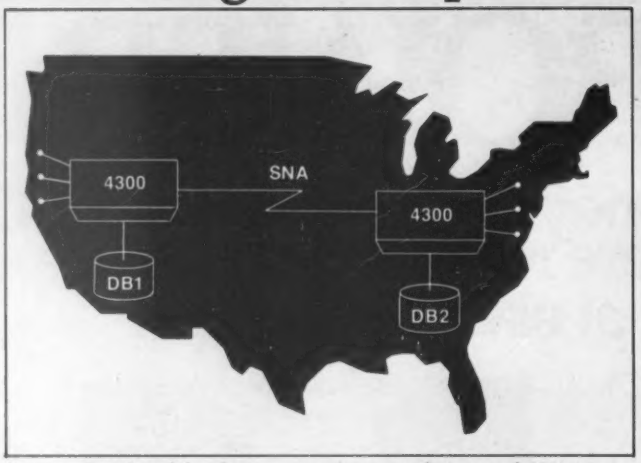


Figure 1. Distributed data base management spans distance and CPU types to pull together important information wherever it resides.

If data is to be distributed, however, it should be done in a format and with tools usable by both the local users and the corporate centralized users as well. Data base management has proven to be an effective approach for both end users and centralized DP. So, to make distributed processing work, we have to extend the concept of data base management systems to that of distributed data base management systems.

Within a single processing unit environment, data base management systems have solved the problem of replication and integrity of data that every corporation faces when data bases are constructed. Now there are potentially new problems in distributing data among various geographically distributed data bases.

Most traditional concepts in data distribution – such as centralization, replication and partitioning – view the data resource implicitly as if it were a total unit, planned and coordinated from a single centralized source. This is the systems analyst's dream: a totally coordinated and integrated data base system distributed over every computer system in the world.

But, it is not a very practical approach for most corporations and certainly not practical from the end-user point of view – that end user who has to draw information from this data.

We have to take a new view on the processing and activities of the data resource. These data resources are combined and related as user needs dictate. Within the arena of distributed processing, we now have to allow local and independent data base growth while retaining the ability to relate these data bases as subsequent needs arise.

Independent, local data bases need to be built by users at remote sites for their own needs and, subsequently, incorporated into the corporate data bank through network facilities. This approach represents a significant departure from the traditional single unit data resource concept that was initiated by the IBM Information Management System.

Compatibility Issue

One of the major considerations in the development of distributed data base processing is the compatibility of operating environments between the various processors. While there are processors that perform individual functions better than others, the best approach in any distributed environment for a corporation is to rely on compatible single suppliers for his processing units – processors and software that are compatible with the central computer facility.

Distributed processing got a big push recently with the announcement by IBM of the 4300 along with the 8100 and System/38 systems. The 4300s represent IBM's distribution of operating systems and application machines to end users.

The 8100 and System/38s are construed as logically and physically independent intelligent workstations for users to enter, store and retrieve their information and then summarize up to the centralized processor. They cannot be a true node in a network environment because there are few communication facilities down to the small systems in the IBM environment.

On the other hand, the 4300 system, in conjunction with the larger 370s

ENVAX™ 500
Communications Terminal
TWX
Telex
DDD
Models available

Dependable, quiet and attractive
ENVAX 500 includes a Teletype® model 43 and boasts modern electronic design and quiet, trouble-free operation.
Memory . . . with no paper tape
16K of memory stores incoming and outgoing messages and eliminates the need for paper tape. Battery backup is a standard feature.
Simplified operation
Operator prompting and text editing feature allows operator to learn machine operation quickly and easily.
Reduced operator time
Automatic call directory, automatic dialing and retry is standard on the ENVAX 500.
Delayed transmission saves money
Messages can be programed to transmit when the rates are the most economical.
Increased reliability
The number of moving parts is reduced and reliability improved through modern electronic design and solid state circuitry.

For more information call:
800-527-7700 or
214-659-3800
vardon & associates, inc.
$99.00 per month
service included!
1401 Walnut Hill Lane
Irving, Texas 75062

Range of Options Opened

(Continued from SR/8)

distribute the processing and data base storage for an airline reservation system, as shown in Figure 4. However, it would be very difficult to distribute the managerial control of such a system.

This is a highly integrated application, all of whose parts must work together in exact synchronization. Otherwise, a customer requesting a reservation in one city might receive a different response than a customer in another city, even though conditions were identical. All aspects of this type of application therefore require strong central control.

A distributed manufacturing control system involving two factories and a headquarters location is shown in Figure 5. In this sytem, in contrast to the airline reservation example, local control can optionally be exercised at each site, providing specialization to best meet local needs. Only data exchange for decision-making and reporting purposes requires standardization under central control.

Management Preference

In general, information processing management favors continued centralized control of all aspects of the system.End users and their management, however, strongly favor local control, stressing the need to meet specialized requirements.

It is to be hoped that objective analysis, based on evaluation of cost, overall management philosophy and application requirements, will soon replace emotion in decisions on how to manage a distributed sytem most effectively.

Booth is manager of Distributed Systems Environment (DSE) Market Requirements at Honeywell Information Systems.

A 'Standoff' Solution •

. . . With End-User Application Needs

and 30 series machines provides a true networking facility for DDP and data base processing through compatible nodes.

They meet the basic requirement that the operating environments are compatible among all processors in the environment. This means that maintainability of data bases, data structures, application programs and high-level user language procedures are reduced to the lowest common denominator, the operating system. This means that if an application runs on one node it will certainly be able to run on another node.

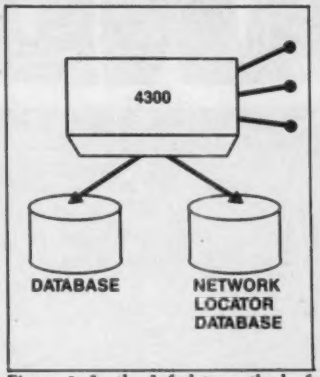


Figure 2. In the Infodata method of distributed data base, the Network Locator Data Base directs each request for information across distance and CPUs and into the data base files to retrieve just the information required.

The next major item is that of communications between nodes in the network. Communications software is the first stumbling block that any organization will run into for implementing a network. Software exists today that allows various nodes in a network to communicate on a superficial level.

The communication riddle is not the biggest problem in implementing networks, but there are no easy solutions and it can be difficult to implement. We're getting to the point where we will be able to communicate in an effective manner soon.

For IBM environments, Systems Network Architecture (SNA) has been around for a while (see Figure 1). While SNA originated as a point-to-point communication facility for terminals accessible to a central CPU, it has been expanded for multiple site distribution of terminals and nodes.

After the machines can talk to each other, there is still a communication problem: How is the user going to communicate with his data in a meaningful manner?

There must be a mechanism to process the data across CPUs. The users should not have to "program" systems for each new requirement. Data base management services with powerful user languages have proven the value of a user interface to data.

The user interface to data must be extended to a distributed environment to allow users to specify their requirements on an ad hoc basis. Thus, a data need is translated into user language statements that provide for data base connections between local data bases and across CPUs.

Eventually, the end user will come to realize that once his local needs are satisfied, there are in the corporation other data resources in which he may be interested. He will want to combine his local data resources with those at the remote parts of the network. He will also recognize the need for the contribution of his data to the corporate information bank.

So where is this all leading us? Towards a network of distributed data bases that have local responsibility for maintenance and use, with an additional requirement of correlating them into a network when the need arises.

Infodata Systems, Inc. has an approach to interconnection of data bases on a single CPU, and we have extended the approach to relationships between data bases across CPUs by adding "a CPU address" to the location coordinator. The users build local data bases and then fold them into the network. This approach provides a facility where the whole is more than the sum of the parts and where each data base can stand on its own or be integrated as required.

Global data bases on the same CPU are defined through connection tables that are dynamic. Global data bases across CPUs are defined, in our terminology, via a network locater data base (see Figure 2). This special data base defines the configuration for the data bases across CPUs, but not for the network. The network is handled via the communications software described above.

Data is a resource best used in the proper environment. We are able to make data base connections in a distributed data base environment for a larger view of any data base environment. We have been able to extend our relational concept of multiple data bases across CPUs to allow individual users the ease of retrieval of information from any node in the network.

Allen Joseph is vice-president of Product Management at Infodata Systems, Inc., Falls Church, Va.

THE ULTIMATE TEAM PLAYER

Centronics Model 730

Centronics' newest miniprinter is the ultimate team player. Fast. Quiet. Ready anytime. Versatile paper handling, excellent print quality, and long-run reliability help make your whole system look good. Best of all, the Model 730 offers all this at an affordable price. With Model 730 on your team, you have the advantage.

ADVANTAGE: 3-IN-1 PAPER HANDLING Model 730's exclusive three-in-one paper handling system gives you built-in flexibility. Payroll checks on pre-printed continuous forms. Inventory listings on fan-fold. Direct mail on company letterhead. General information on roll paper. The 730 does it all. Easily.

ADVANTAGE: EXCEPTIONAL PRINT QUALITY Model 730's 7x7 dot matrix serves up high quality, legible characters — even when printing multiple copies. The key to excellent print quality is the free-flight print head technology — a standard feature. This gives you longer head life and smoother operation.

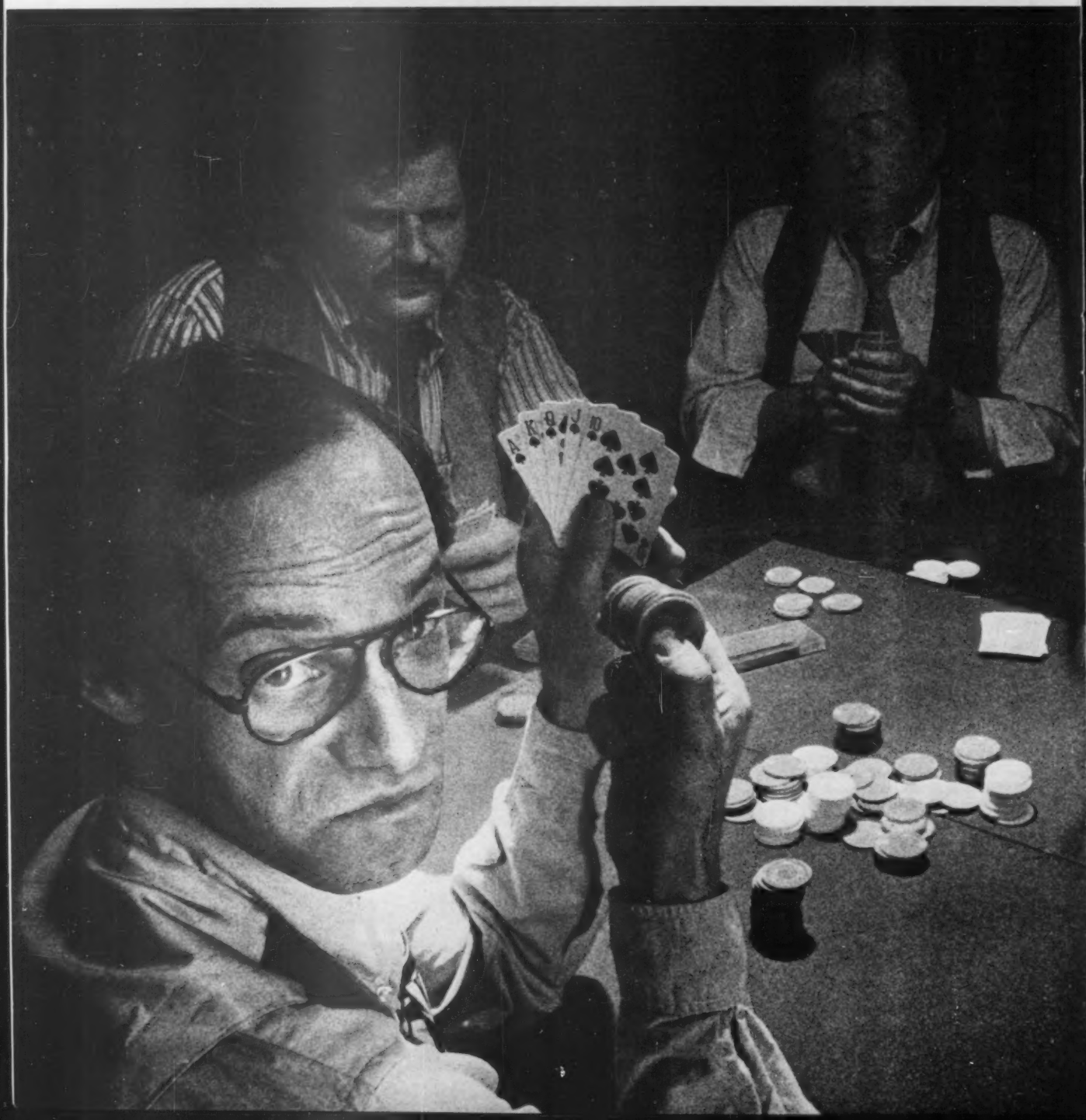
ADVANTAGE: OUTSTANDING RELIABILITY The simplicity of the Model 730's design insures maximum reliability and maximum in-service time from your system. You get the greatest return on your printer investment.

ADVANTAGE: COMPACT DESIGN Model 730 packs all this performance capability into a stylish unit that can fit right on your desktop. It's no larger than a portable typewriter and weighs less than 10 pounds.

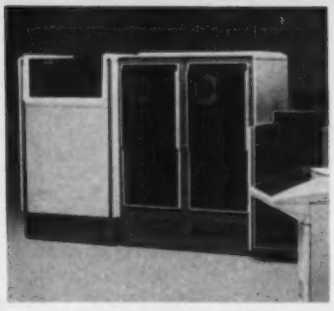
With all its unique features, Model 730 is still priced within the budget of even the most cost-conscious systems owner. For more information on how to sign Model 730 to your team, write or call today: Centronics Data Computer Corporation, Hudson, New Hampshire 03051, (603) 883-0111.

CENTRONICS PRINTERS
...the advantage

WE SAW THE 32-BITS. AND



INDUSTRY'S RAISED 'EM.



INTRODUCING ECLIPSE® MV/8000, the fast new processor that gives you high throughput, high performance, and unmatched reliability, and the most compatible 32-bit computer system in the industry.

You need a 32-bit system that thinks fast. MV/8000's 36.4 MB/sec. memory bandwidth is two-to four-times faster than its nearest competitor. And it features a unique three-level I/O system using independent processors that drive high-speed busses and as many as 128 terminals.

Need hot architecture? MV/8000 gives you one of the industry's most advanced virtual memory management techniques, plus 4 gigabytes of logical address space, 6.6 gigabytes of on-line storage, and user programs as large as 512 megabytes–that's 16 times larger than the competition's.

Your MV/8000 also has unmatched reliability and maintainability. It comes with its own independent microNOVA™-based System Control Processor that continuously monitors a diagnostic bus, and identifies hardware faults right down to the field-replaceable unit. Plus, you get enhanced maintainability with a totally alterable control store–the first ever on a 32-bit mini-mainframe.

How about system security? MV/8000 gives you an 8-ring security system that divides the address space into eight imbedded protection areas, each with a unique privilege level. That secures system resources and user's privileged routines.

You need a 32-bit computer that speaks your language. MV/8000 speaks just about all of them, based on its new, ultra-sophisticated AOS/VS operating system that's compatible with our time-tested AOS (Advanced Operating System). AOS/VS has optimized micro-code for high-level languages like ANSI FORTRAN 77, ANSI BASIC, and ANSI PL/I. What's more, AOS/VS can run COBOL, DG/L, DG/DBMS, TPMS, INFOS II, AZ-TEXT™ word processing, RCX70 (3270) and RJE (2780/3780).

Compatibility? Forget about emulation, mode bits or rewrites. Along with its new 32-bit applications, MV/8000 executes all existing AOS-based ECLIPSE programs. You don't have to change programs, peripherals, interfacing, documentation, or people.

MV/8000, new from Data General. From now on we hold all the cards in 32-bit systems. Bet on it. And win.

Data General Corporation, Westboro, MA 01580, (617) 366-8911. ECLIPSE is a registered trademark and microNOVA & AZ-TEXT are trademarks of Data General.© Data General Corporation, 1980.

Data General

Mail to: Data General Corporation, Westboro, MA 01580
☐ Your MV/8000 sounds like a winner. Send complete info. ☐ Deal me in now. Send a sales rep.

Name Title Tel.
Company
Address
City State Zip

CW728

Users Advised on DDP Chargeback Procedures

PENNSAUKEN, N.J. — User chargeback procedures ensuring that the objectives of a distributed data processing (DDP) system are achieved are essential for the system's success, according to William E. Perry, author of a paper on "User Chargeback Procedures for Distributed Systems."

Distributed systems have certain distinguishing characteristics that may require an organization to reassess existing chargeback procedures that work for nondistributed systems, Perry explained. These differences include the following:

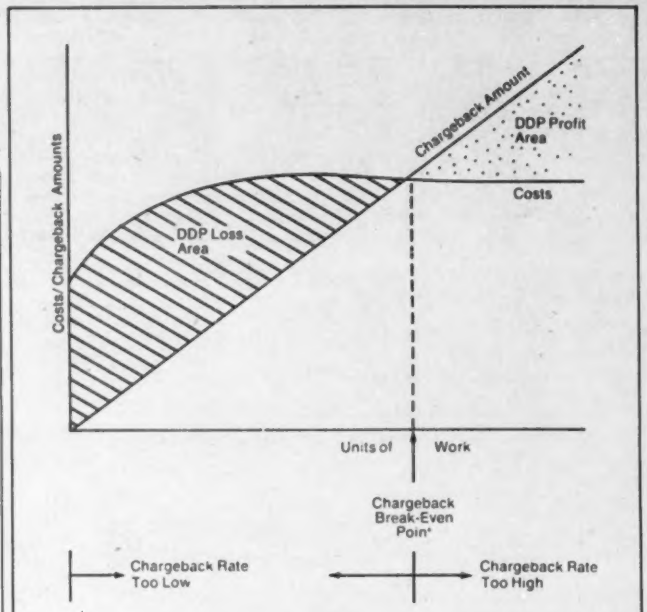
• Absence of centralized control. Coordination of users operating the system usually lacks the authority found in most centralized systems.

• Capability to reject requests. Each workstation in a distributed system is autonomous and has the option to accept or reject requests from other workstations.

• Users direct operations. In a distributed system, a work overload may occur at one point in time and be immediately followed by a slack period.

• Resources are movable. The cost of moving and storing the resources must be considered when developing a distributed chargeback algorithm.

Resource costs which Perry, executive director of Accountants Computer Users Technical Exchange, recommended for consideration in the chargeback algorithm include those for on-line and off-line hardware, software packages, and in-house software development, communications facilities, data base establishment and maintenance, processing capabilities, resource movement, message rejections by users, support personnel, support hardware and software, job priorities and direct administrative charges.



Chargeback Costing Chart

Chargeback procedures should be developed "hand in hand" with other procedures for the distributed environment, Perry stated and recommended that the information systems manager keep in mind that the cost of executing a unit of work in a distributed facility is not directly proportional to the amount of work performed.

'Break-Even Point'

In order to determine a chargeback rate that will exactly recoup all DDP costs, the manager must find what Perry called the "chargeback break-even point" for his installation. If the "fair value" approach is taken (users are charged for the cost of the resources they use) when designing chargeback procedures, Perry maintained the ideal chargeback rate equals the chargeback break-even point. The chargeback rate per unit of work equals:

$$\frac{\text{Total DDP System Costs}}{\text{Estimated Units of Work at Break-Even Point}}$$

For example, if the cost to operate the DDP system is $250,000/year and 10,000 messages are processed per year, the chargeback rate is $25/message.

In order to avoid a loss or profit position, Perry maintained, information management departments have adopted strategies that include adjusting the rate at regular intervals to reflect changing conditions, adjusting user charges at the end of each accounting period to reflect actual costs or transferring the profit or loss to the organization's overhead so it can be billed to the departments along with other administrative charges.

Management Considerations

Chargeback procedures can be developed by either the company's top management or by its DP management, according to Perry, but in either case, he recommended that the following management considerations be evaluated during this process:

• User control over facilities. A user who demands exclusive use of resources during normal working hours can be charged more for those facilities than another user who shares the resources.

• User-owned resources. The chargeback algorithm can be developed to either encourage or discourage users to buy their own hardware.

• Single-user facilities. If a special piece of hardware or software is needed for a single user, that user should be charged the entire cost of the facilities.

• Facilities for limited numbers of users. If the facilities are obtained for a limited set of users, only the involved users should be charged for the use of the facilities.

• Lead terminal charges. If one terminal is designated as the lead node in a system, charges for the functions performed at the terminal should be allocated among all users.

The entire report, which also described chargeback data collection methods and gave criteria for measuring resource usage within an installation is part of the distributed processing management volume from Auerbach Publishers, Inc., 6560 N. Park Drive, Pennsauken, N.J. 08109.

A Radical Departure in Computer Publishing.

Computerworld UK is a weekly news medium aimed directly at the most powerful 25,000 people in the British computer using marketplace.

With a circulation designed as scientifically as any of the equipment supplies and services that it will help to sell, Computerworld marks a radical departure in the annals of British publishing.

Many publishers (all the good ones) design their circulation profile carefully, based on available, and sometimes especially commissioned, research. They know who they need to reach. Achieving their goal by mailing is difficult and costly. Even with the very best help it is never possible to say with any degree of certainty that the perfectly conceived profile has been actually achieved. Until now.

In this case the research was carried out by the world's most respected and authoritative computer related market research company, International Data Corporation. From their files they could tell us what had been spent, on what and by whom. Certainly they could readily identify from their existing records the 8,000 companies operating the 17,100 most important systems on over 11,000 sites. Of the $6,200,000,000 spent last year in the EDP market $5,300,000,000—86%—was spent by those 8,000 companies.

Staggering news for some but the basis on which we offer our new weekly to advertisers. We have made the link between the conceived profile and the actual circulation. So how do we do it?

We have contacted every one of those 8,000 identified companies, and spoken to the man in charge of the computer system. We have also established his real function (job titles can be confusing) and found out if he has a board director or other senior manager whose say so he needs to purchase and at what level. We have spoken to the vast majority of the most important and influential people in the business.

If you'd like to know more about Computerworld UK and the editorial excellence that will keep our readers loyal, talk to Diana La Muraglia at (617) 879-0700 now.

COMPUTERWORLD UK

weekly news for the computer community

CW COMMUNICATIONS/INC.
375 Cochituate Road, Route 30/Framingham, MA 01701

Despite Tenfold Load Increase

Offloading Lets Insurer Halve Processing Time

By Jeffry Beeler
CW West Coast Bureau

SAN JOSE, Calif. — In the three years since it began installing its first distributed network, a workers' compensation insurance company has managed to cut its processing turnaround times in half, even though its computing work load has increased at least tenfold.

The user — Employee Benefits, Inc. (EBI) — credits the improved processing efficiency to its installation of a distributed network that ties the company's main computing center here to its five subsidiary sites in the field.

In effect, the network has enabled EBI to transfer or "offload" most of its insurance administration functions from its central office to its remote locations, where many of the firm's policies originate, according to Dana Brown, the company's information systems vice-president.

At the network's heart lie three Hewlett-Packard Co. (HP) 3000 Series IIIs, which communicate point-to-point with about 100 CRT terminals at EBI's remote sites in Portland, Ore., and in four California cities, Sacramento, San Diego, Santa Monica and San Jose. From these distant terminals, the company performs all its major insurance functions, including claims processing, premiums administration and policy issuance.

Claims Use

In the claims area, the firm's terminals are used for checking the validity of each benefit request and later for paying the claims themselves. To authorize a payment, operators enter a beneficiary's name, address and other pertinent data into the terminals, and the system automatically places the input into the appropriate blanks of computer-stored claims forms, Brown said.

The system then updates the approved payment against its data base and uses an on-line HP 2641 terminal to print claims checks at the remote site where the transaction began. The same terminals are also used later in batch mode to do statistical reporting for EBI's actuarial department.

The company's longest program is the one for policy issuance. Working in character mode, the program uses a Ksam file-management system and several of HP's Image data bases to check insurance rates and types of coverage, issue policy numbers and — during the evening shift — to print finished policy documents.

Former System

Before it installed its current network, EBI performed most of its insurance administration tasks manually and farmed the remaining applications out to a nearby service bureau. But as the company's growth accelerated, EBI officials became increasingly concerned that their expanded computing work load would overwhelm their manual processing system and hinder their ability to respond promptly to policyholder requests, Brown recalled.

EBI officials also expressed concern about the firm's growing inability to maintain adequate records. Under the manual system, none of the company's policyholder data was stored centrally. Instead, each remote location kept its own files independently of the other sites, and agreement between the files typically averaged only about 70%, Brown said.

Realizing they faced a potential recordkeeping crisis, EBI officials began phasing out the old manual processing system in October 1977 and installing the current distributed network in its place. Since then, the company's annual revenues have grown tenfold from $15 million to $150 million, and its record-processing volume has expanded by a factor of 10 to 20.

Yet despite its rapid growth, the firm's claims processing and policy preparation turnaround times have shrunk during the same period from two days to just one, Brown said.

Current Configuration

In its current configuration, EBI's distributed network uses HP 2645 CRT terminals for data entry and HP 2621 CRT terminals for data inquiry. The data entry terminals, which operate in block mode, are outnumbered by their data inquiry counterparts by about two to one.

With the help of short-haul modems and Codex Corp. concentrators, the data entry terminals transmit 2,400 bit/sec and the inquiry terminals 1,200 bit/sec over leased telephone lines. All transmissions from the terminals go to three 2M-byte 3000 Series IIIs, all three of which are supported by HP's Multi-Processing Executive real-time operating system.

In the end, the contents of EBI's claims files and other insurance records are stored in the central computing site's 50M-byte HP 7970 and 120M-byte HP 7925 disk units. Altogether, each of the 3000 Series IIIs is configured with about 500M bytes of on-line disk storage.

Two of the processors are dedicated to daily production work, while the third is used exclusively for system development.

These spheres are a primary component in the Agastat®, pneumatic indicators, produced by Amerace Corporation–a company that relies on MDS SERIES 21 Systems.

The Information Controller

MDS SERIES 21 Distributed Data Processing System

Controlling The Flow Of Vital Data– a key ingredient in an effective information management program. MDS SERIES 21 Distributed Data Processing Systems– with their exceptional communications capabilities–provide the means of controlling this vital flow.

With SERIES 21 Systems– branch, production facilities, warehouses and field sites can have today's information today–as a matter of fact, they can have it in minutes... and process it where it's received.

Efficient communication is only one of the advantages offered by MDS SERIES 21 Systems. But, to companies like the CONTROL PRODUCTS DIVISION of AMERACE CORPORATION, it's a very important one.

Utilizing these systems, they have reduced order processing time at the central office from days to hours. Production efficiency has improved by allowing plant managers to analyze machine operations on a daily basis, and tighten controls on raw material ordering and product shipping.

In short, MDS SERIES 21 Distributed Data Processing Systems have substantially helped improve this company's overall information management–as they have in many industries–worldwide.

Communications capabilities. the flexibility to do multiple jobs concurrently, local programming capability and expandable modular design are just some of the advantages MDS SERIES 21 Systems offer... there are many more. Let MDS show you.

Call or write MDS today.

☐ Please send additional information ☐ Please have an MDS representative call for an appointment. ☐ Please call our M.I.S. Manager.

Name Title

Company

No. & Street Phone

City/State/Zip

CW72880

MDS MOHAWK DATA SCIENCES
7 Century Drive, Parsippany, N.J. 07054
(201) 540-9080

® Agastat is a registered trademark of the Amerace Corporation.
SERIES 21 Reg. U.S. Pat. & Tm. Off.

The Prime 750. The best way to go big without going with the biggest.

Contrary to popular opinion, mainframe capability does not have to be purchased from a mainframe company. As evidence, we offer the affordable, interactive Prime 750.

The 750 is designed around a full 32-bit central processor. It supports industry-standard FORTRAN '77, ANSI '74 COBOL, CODASYL DBMS, BASIC, PL/I, RPG II, and a full range of communications products. And it also supports up to 8 million bytes of error-correcting main memory, up to 2.4 billion bytes of disk storage, and as much as 32 million bytes of virtual memory for each of up to 63 simultaneous users.

All of which means the 750 can handle just about anything you can throw at it, including huge computational analyses, big data processing tasks for business, and complex data communications applications.

As you can see, the 750 has a lot in common with much more expensive

mainframes. But perhaps what's equally important are the differences. For example, the 750 is interactive–a highly desirable feature on a computer with this kind of mainframe power.

Also, the same 750 that runs your business programs can simultaneously crunch some very big numbers. And since it's likely that distributed processing will be part of your plans, the 750 is supported by an exceptionally wide range of networking software, including our own PRIMENET,™ which allows local and remote communications, and supports the X.25 international packet switching protocol.

The 750 can stand on its own as a powerful and versatile computer. But it's just one of the fully compatible Prime 50 Series computers–including the 250, 550, 650, and 750–that share the same operating system, the same file system, and the same communications products. So even if you start with a smaller Prime computer, you can upgrade all the way to a 750 without program recompilation or software modification. Which means your considerable investment will be protected.

In fact, when you consider all it can do, a Prime 750 could easily be the best investment you'll ever make.

If you're thinking big, contact the nearest Prime office, or write to our Advertising Department, 3 Newton Executive Park, Newton, MA 02162.

PRIME
Computer

Many Avoiding Comprehensive Plans

Backup Can Prove Obstacle, Network Users Say

By Ann Dooley
CW Staff

Most companies try to avoid planning comprehensive backup procedures and the headaches that accompany them, but the headaches can grow even worse in a distributed data processing (DDP) environment.

In a sampling of six DDP sites around the country, *Computerworld* found no one who had ever had to use an emergency backup plan. But few had done any comprehensive planning for the eventuality of a disaster.

Most of the users noted that the expense of backup facilities was a major reason they did not have them. Disaster plans are difficult to carry out, costly to support and, in some cases, hard to justify to supervisors, several claimed.

Communications costs, for instance, particularly in an on-line DDP environment, would be especially costly, the managers indicated.

Several of those surveyed seemed to prefer playing the odds, hoping to be spared any disaster situation, rather than implementing thorough plans. And if a disaster did occur, they said they hoped their methods would ease them through the crunch — which would, they hoped, be short-lived.

Although several managers said they would revert to old, more cumbersome manual methods, no training in old methods had been conducted nor had walkthrough situations simulating disaster conditions ever been performed.

The users disagreed as to whether management would lose control in a backup DDP environment. If centralized control were maintained, users felt there would be less difficulty, but if user sites normally were in control of their own processing, problems could develop, several noted. Different management opinions and time schedules would come into play, creating difficulties in an already difficult situation, they said.

'Several of those surveyed seemed to prefer playing the odds, hoping to be spared any disaster situation, rather than implementing thorough plans.'

Most of the computer operations were originally designed with little thought to backup operations, making it more difficult to implement a plan for an increasingly complex and ongoing system. Only one site, the Hartford Insurance Group, which is now planning a DDP environment, is creating built-in disaster relief.

The Hartford is "giving a great deal of thought to backup" and is currently considering establishing a complete alternative data center for its DDP operations, scheduled to be operational in 1982, according to Carol Vance, director of research and technology.

But Vance noted that an alternative center creates complications of redundancy between files and also drastically increases communications and storage costs.

"Many people think DDP backup is easy since the work is being done on smaller units, but the same basic concerns must be answered as in a centralized site," she said. Some of the work load can be shared, but there are many support aspects that need attending to, she noted, adding that it is easier to lose control of backups at separate and dispersed sites.

Some of the users indicated that DDP itself is a kind of backup and that if one site went down the work could be offloaded to another site. Vance, however, feels that to be effective, a backup plan must be integrated into the normal security and audit procedures.

Reciprocal Agreement

Tom Bartz, corporate director of management systems at Medalist Industries, Inc. in Milwaukee, Wis., has arranged a reciprocal agreement with several companies in the area to trade facilities in case of disaster. But there aren't any companies that can accommodate on-line backup plans, Bartz said, adding, "We can bite the bullet with batch work for only so long."

Setting up another on-line site would require installing phone lines, which would take a long time, and moving people as well as data. "It gets muddy pretty quickly," he said.

If a disaster hit Kinney Drugs, Inc.'s DDP sites with headquarters in Gouverneur, N.Y., Steve Hayden would move the operations to another site with a similar system. "Our own people would move there and work around the normal shifts. We would convert on-line to batch and use the off-site documentation and files," he said.

"We could delay some of the functions for about a week, but after that we would have to start processing everything or we'd never catch up," he noted.

Sandia Laboratories in Albuquerque, N.M., developed its own backup utility system which can restore individual accounts, parts of individual files or the entire system, according to David Darsey, supervisor of the DDP system. The Sandia system, however, is a scientific rather than business information system and runs in a time-sharing mode, which makes backup much easier to arrange, he pointed out.

One user, who wished to remain anonymous, noted that although he had a reciprocal trade backup plan for his mainframe, the only backup for his DDP system was to revert to a manual system or to offload some of the work to other sites. "We just don't plan to be down that long," he said.

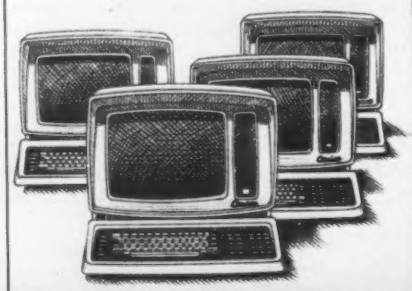
HOW TO COMPLEMENT

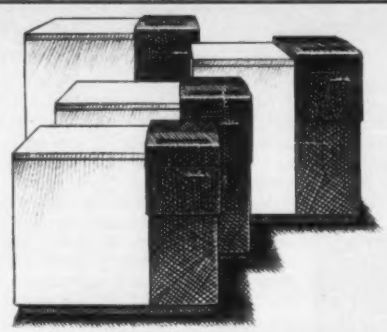
3270

IBM mainframes can play host to many guest terminals. But a lot of them don't give you some important functions. That's why we offer our complements. The Courier 270 Information Display System. A complete family of displays, controllers and printers that are compatible with the entire 3270 family, including IBM's 3274/6/8 models.

A WELCOME DISPLAY

Our 270 System is a welcome alternative. Designed to maximize operator productivity, our 3278-compatible display terminals give you non-glare, non-smear screens that reduce eye fatigue and improve display clarity. An easy access PF key for faster operation. And ten-key pads on the side for rapid entry of numeric data.





BETTER CONTROL.

When your terminal needs to talk to your host, attach a Courier controller and you can get redundancy that provides 100% backup and a data capture mode that

What's Holding Some Users Back From DDP?

ELLICOTT CITY, Md. — What factors keep an organization from converting or increasing its commitment to distributed data processing (DDP)?

This question was among those put to DP managers selected on a random-sample basis for a survey entitled "DDP Markets: Survey and Analysis" conducted by Impact Marketing Services here. The replies of some 91 users reflected an average of two major constraints on an installation's movement towards DDP, although the specific factors differed from company to company.

More than one-third (34) of the managers indicated that a lack of substantiated cost/benefit data was the most important constraint in their environment. Central staff personnel limitations were specified as a drawback by enough users to come in a close second in number of responses (32).

Limitations in the staff stationed at the remote sites were cited as a negative factor by 26 respondents, and Impact Marketing pointed out that if central and remote-site staffing constraints are grouped together, staffing represented the most significant obstacle to increased DDP since it was mentioned by some 58 of the DP organizations polled.

Approximately one out of five users stated that software limitations and/or the cost of data communications were constraints at their installations, and hardware limitations or the absence of DDP requirements in their current environment were mentioned by a low percentage of the respondent base (12% and 7%, respectively.)

By Industry Type

When analyzing the responses on an economic basis by industry type, Impact Marketing noted that lack of substantial cost/benefit data was mentioned most often by users in retailing and the all-encompassing "other" classification. Retailers ranked central staff limitations equally high and the central staff constraint also drew the most responses from representatives of manufacturing and financial services organizations.

Transportation-sector respondents ranked software limitations as the principal drawback while insurance firms cited remote-site staff limitations as the most important constraint.

Other sectors represented in the survey were wholesaling, data processing services, government and education.

When analyzed by the extent of data communications needs, the respondent cluster composed of firms with nonexistent, local and regional requirements emphasized different constraints from those listed by the firms needing national and international data communications services.

While the former group ranked central staff limitations as the principal constraint to increasing movement toward DDP, the latter group felt that remote staff limitations coupled with the lack of substantiated cost/benefit data were the principal restrictions to DDP growth (see table).

CONSTRAINT	(NONE/LOCAL/-REGIONAL) I	(NATIONAL/-INTERNATIONAL) II
Lack of Substaniated Cost/Benefit Data	2	1
Communications Costs	7	3
Central Staff Limitations	1	4
Software Limitations	4	5
Remote Staff Limitations	3	1
Hardware Limitations	6	7
Insufficient User Interest/Education	5	6
Other	8	9
DDP Requirements Don't Exist	9	7

Insufficient education and interest in the user departments at these companies was cited by only 16 of the DP managers, but when 90 of these respondents were asked about user department interest in DDP, almost 40% (34 of the total number of respondents) said users were either unaware of the potential benefits of DDP or were uninterested in becoming directly involved in it.

Another 40% of the same group rated the user interest in their organizations as "somewhere between 'ecstatic' and 'couldn't care less.'" The relatively low number of remaining companies (17 out of 90) said all of the user departments were interested in DDP.

Transportation firms generally (67%) reported low levels of DDP interest among user departments, while total unawareness of the possibilities offered by DDP was an important factor to 35% of the representatives from the manufacturing area.

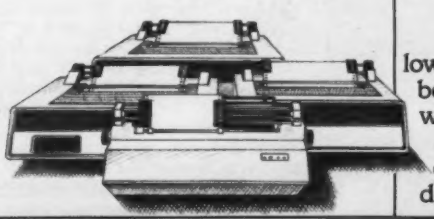
This is in contrast to the fact that none of the wholesaling industry respondents reported low levels of interests in DDP in user areas.

THE ALMOST PERFECT HOST.

monitors communications traffic for easier trouble-shooting.

GREET OUR PRINTERS.

If you're entertaining thoughts of a printer, look no further than our new 55cps letter-quality printer. Or our full line of dot matrix and line printers.



QUICK ARRIVALS.

If you've had problems swallowing the delivery schedules you've been fed by other suppliers, ours will be quite a treat. Because right now, we're shipping 3278-compatible products with fast delivery.

So for local or remote operation, play host to our entire 270 family. You get improved operator productivity, better delivery and more functions for your dollar. Call your nearest ITT Courier branch office for our latest technical bulletins. Or contact us at ITT Courier Terminal Systems, Inc., 1515 W. 14th Street, Tempe, AZ 85281. We'll make sure you get the perfect complements to an almost perfect host.

Call toll-free (800) 528-1400.

ITT Courier

No 'Standard' Solution

Users Vary Approaches to DDP Security

By Bruce Hoard
CW Staff

Everybody seems to have a different idea of the best way to handle security for distributed data processing (DDP) systems. Because of the lack of mature technology, there is no standard for protecting such systems.

Burger King Corp., the First National Bank of Boston and the Chase Manhattan Bank have all taken divergent paths toward security on their DDP systems.

The fast-food chain processes data from its nationwide network of restaurants through 25 regional and distribution centers using Nixdorf Corp. Model 650 minicomputers. The minis are hooked into an IBM 370/158 at corporate headquarters in Miami. The operating systems on the minis feature ID and password protection.

The system is "just getting off the ground," according to James Freeman, Burger King's Miami data center manager, who added it has been in development for approximately a year and a half "and is growing daily."

There are few uniform security standards enforced at all 25 remote computing sites, Freeman said. "They all have their own way of accessing the system," largely because many sites are located in rented office spaces in various buildings around the country.

Each center does have backups for its documents stored on tape and disk, and main computer rooms must be locked when not in use.

Burger King's strongest line of defense against data intrusion is to be found in Miami, where the company runs IBM's RAC FII data security package on its 158. "We are trying to protect the remote job entry input-type access and secure our own local and remote Time-Sharing Option operation," Freeman said.

When a remote site wants access to the Miami mainframe, it must deal with RAC F. "Each particular regional or distribution center has its own ID code so that when they log on; we can monitor them," the manager said, and one remote center may not access data from another.

The restaurant chain is using its own in-house encryption system to retrieve daily data on cash, sales and other areas it considers to be of interest to the competition, Freeman noted.

The First

The First National Bank of Boston enforces a more rigid, standardized set of security measures than does Burger King. William R. Synott, senior vice-president for Information Systems and Services, described a tightly controlled global network closely monitored from corporate headquarters in Boston.

Although Synott said the First employs a wide variety of computers throughout its distributed system — which includes 57 processors around the world — there is currently a preponderance of IBM System/34s, he explained.

The remote sites all answer to two IBM 3032s and two 370/158s in Boston running RAC F, a system the vice-president said he was satisfied with, but which is "pretty difficult to operate with and a lot of work to implement."

The bank distributes two sets of standards to its remote computing sites, Synott said. The regional data centers in London; Buenos Aires, Argentina; Sao Paulo, Brazil; and Boston get one set, while the smaller sites reporting to those regions get another.

"The standards we issue to each site indicate what responsibility they have for the security and control over their physical facilities and data and spell out in general terms what they need to provide, what they need to protect and how," he said.

"What we do is issue London a full set of standards, then issue Paris a shortened version that applies only to minicomputer locations and describes regulations for protecting computers and files."

All programming, development and maintenance is done in the regional centers. To make sure of that, the compilers are removed from the subregional minis, leaving them with object language only. "We distribute our computers, but not our program development. The sites cannot do anything other than what that machine is programmed to do.

"If Paris has a problem, they call London, which is on a communications switch to them. They turn on the machine and London does the diagnosis, solves the problem, recompiles the program and downloads it to give the object code again.

Chase Manhattan

The Chase Manhattan Bank uses a less centralized, but equally rigid approach to security for its worldwide distributed processing network consisting of approximately 45 computer centers.

Chase allows various departments to develop their own security standards, but closely oversees the process and makes sure there is top-level management approval of any finalized plans.

The process began two years ago, when a Systems Review Committee

(Continued on SR/22)

TRW SERVICES HAZELTINE TERMINALS...

Even with the best equipment, like your Hazeltine terminal, service problems may occur. Usually when you can least afford them. Repairs may take hours, days, or even longer.

Instead of waiting, call TRW.

TRW's Customer Service Division–the exclusive maintenance service representative for Hazeltine video terminals in the U.S.–can provide you with a complete Service Agreement Program that assures you of fast repairs...thus minimizing downtime.

Whether you're in New York City or Eugene, Oregon...Bismarck, North Dakota, or Miami, you're just a phone call away from a TRW service district, supported by our nationwide computerized inventory network. TRW stocks virtually every Hazeltine part and printed circuit board you may need.

To make sure the equipment is repaired fast, we utilize a staff of over 2,000 field service representatives. Many specialize in servicing Hazeltine terminals, just like yours. You're not subject to responses like, "I'm ill. Can't get to you for a few days." Or, "I'll be on vacation for two weeks." Whenever you need service, a TRW representative will be there.

We've committed more than $4.8-million in parts, training, diagnostics, documentation, and new testing equipment to our Hazeltine Service Management Program. Therefore, in many cases, TRW can provide you with complete service management every year at a cost that's lower than a single service call.

As the largest national independent service organization in the computer industry, TRW Customer Service is dedicated to service and service alone. What you receive is virtually all the benefits of having your own personal service staff and inventory.

On call at a moment's notice.

For a free copy of a Capabilities Brochure that explains TRW's Hazeltine Service Management Program...or for a free inspection and cleaning of your Hazeltine terminal as part of your new, low-cost maintenance agreement, simply fill out the coupon. Or, for a faster response, call Joan Gillman now at TRW Customer Service Division, 70 New Dutch Lane, Fairfield, NJ 07006 (800) 526-2273 (from NJ dial (201) 575-7110).

A COMPANY CALLED TRW

I am interested in:

☐ Free inspection and cleaning as part of a new, low-cost maintenance agreement (parts excluded).

☐ Capabilities Brochure on TRW's Hazeltine Service Management Program.

My installed equipment is _____

Name _____ Phone _____

Title _____

Organization _____

Address _____

City _____ State _____ Zip _____

COMPUSTAR™

INTERTEC'S NEW $2500 MULTI-USER SMALL BUSINESS COMPUTER

At last, there's a multi-user microcomputer system designed and built the way it should be. The CompuStar™. Our new, low-cost "shared-disk" multi-user system with mainframe performance.

Unlike any other system, our new CompuStar offers what we believe to be the most practical approach to almost any multi-user application. Data entry. Distributed processing. Small business. Scientific. Whatever! And never before has such powerful performance been available at such modest cost. Here's how we did it . . .

The system architecture of the CompuStar is based on four types of video display terminals, each of which can be connected into an auxiliary hard disk storage system. Up to 255 terminals can be connected into a single network! Each terminal (called a Video Processing Unit) contains its own microprocessor and 64K of dynamic RAM. The result? Lightning fast program execution! Even when all users are on-line performing different tasks! A special "multiplexor" in the CompuStar Disk Storage System ties all external users together to "share" the system's disk resources. So, no single user ever need wait on another. An exciting concept . . . with some awesome application possibilities!

CompuStar™ user stations can be configured in almost as many ways as you can imagine. The wide variety of terminals offered gives you the flexibility and versatility you've always wanted (but never had) in a multi-user system. The CompuStar Model 10 is a programmable, intelligent terminal with 64K of RAM. It's a real workhorse if your requirement is a data entry or inquiry/response application. And if your terminal needs are more sophisticated, select either the CompuStar Model 20, 30 or 40. Each can be used as either a stand-alone workstation or tied into a multi-user network. The Model 20 incorporates all of the features of the Model 10 with the addition of two, double-density mini-floppies built right in. And it boasts over 350,000 bytes of local, off-line user storage. The Model 30 also features a dual drive system but offers over 700,000 bytes of disk storage. And, the Model 40 boasts nearly 1½ million bytes of dual disk storage. But no matter which model you select, you'll enjoy unparalleled versatility in configuring your multi-user network.

Add as many terminals as you like - at prices starting at less than $2500. Now that's truly incredible!

No matter what your application, the CompuStar can handle it! Three disk storage options are available. A tabletop 10 megabyte 8" winchester-type drive complete with power supply and our special controller and multiplexor costs just $3995. Or, if your disk storage needs are more demanding, select either a 32 or 96 megabyte Control Data CMD drive with a 16 megabyte removable, top loading cartridge. Plus, there's no fuss in getting a CompuStar system up and running. Just plug in a Video Processing Unit and you're ready to go . . . with up to 254 more terminals in the network by simply connecting them together in a "daisy-chain" fashion. CompuStar's special parallel interface allows for system cable lengths of up to one mile . . . with data transfer rates of 1.6 million BPS!

Software costs are low, too. CompuStar's disk operating system is the industry standard CP/M*. With an impressive array of application software already available and several communication packages offered, the CompuStar can tackle even your most difficult programming tasks.

Compare for yourself. Of all the microcomputer-based multi-user systems available today, we know of only one which offers exactly what you need and should expect. Exceptional value and upward growth capability. The CompuStar™. A true price and performance leader!

INTERTEC DATA SYSTEMS®

2300 Broad River Rd. Columbia, SC 29210
(803) 798-9100 TWX: 810-666-2115

*Registered trademark of Digital Research, Inc.

IBM 4331 Seen Problematical in Some Nets

By a CW Staff Writer

GREENWICH, Conn. — IBM's 4331 CPU is turning out to be the weakest link in distributed processing networks involving 4300s and 8100s, according to one analyst here.

Although the hardware in the 4300 line appears sound, coping with the machine's 370-based software is proving too much for inexperienced users, Dave Stein, an analyst with the Gartner Group, said.

With much of it mired in the early 1960s, IBM's 370 software is "a horror story in three acts." Few people have the background and historical perspective to cope with the many changes that have been made to 370-based software in nearly 20 years. That lack of experience creates a particular problem on 4331 systems where people other than systems programmers are often expected to be able to set up and run the systems, Stein said.

Just bringing the systems up is often a challenge to the novice user, he said. IBM suggests large companies develop teams of 4300 and 8100 installers who will bring up each machine in a distributed system the same way. However, company politics often halts those plans, leaving users at the remote site to their own resources when it comes to installing 4331 systems, Stein said.

IBM's larger 4241 processor hasn't experienced as many installation problems because more seasoned programmers are usually on hand at those sites to aid with installation operations, Stein added.

While Stein's assessment of the 4331 in a distributed system seems somewhat bleak, one user of such a system said he hasn't experienced problems with 13 installed 4331s.

While noting one installation's success doesn't indicate a trend, Louis Bohache, senior vice-president of systems planning at Farmers Insurance Group in Los Angeles, said his 13 remote users have adapted very well to the 4331 with the DOS/VSE operating system after converting from a 360/30 environment.

Although Bohache went along with IBM's recommendation of using crack teams of company specialists to install the 4331s, he added the firm hasn't experienced problems with remote users being unable to run the CPUs after they were installed.

Bohache added the firm didn't provide special training for its personnel in how to use 370 software; it just introduced the software to its employees in small pieces.

Brighter View of 8100

While Stein seems somewhat unimpressed by the 4331, he holds a lot of hope for IBM's 8100.

Although to date the 8100 seems to have made a less-than-impressive impact on the distributed marketplace, that will quickly change as soon as IBM irons out some of the software bugs associated with that system, Stein said.

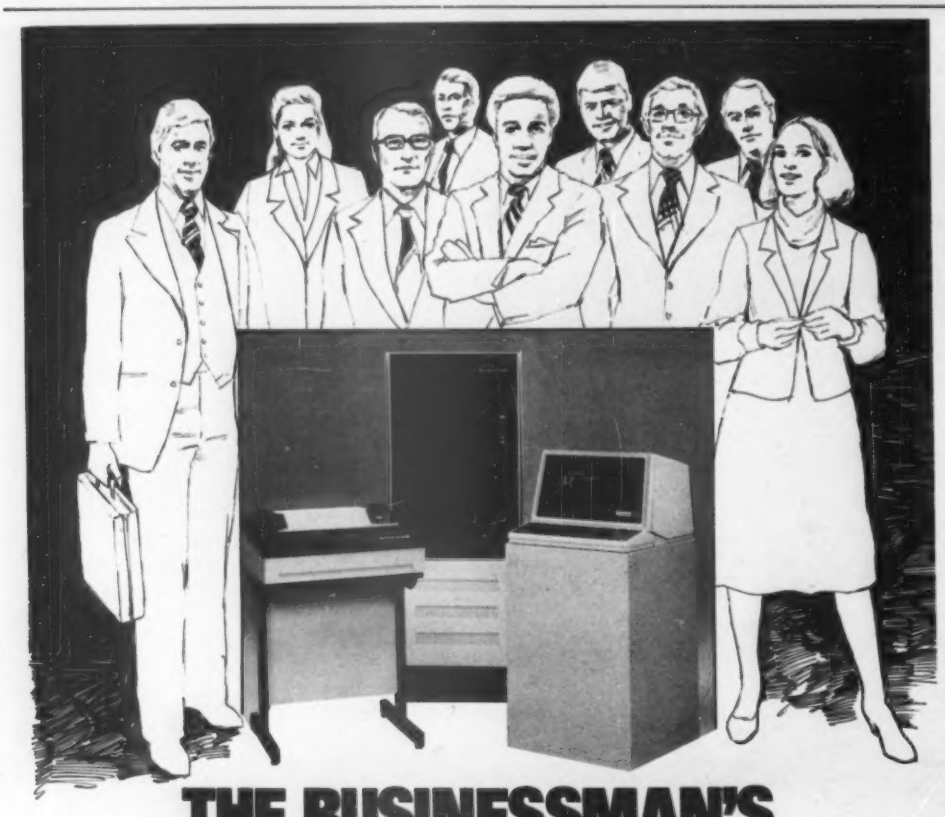
Equating the 8100 with earlier IBM announcements that offered a combination of new hardware and software, such as the 360, Stein said early problems with such a system are not uncommon.

"The combination of ignorance and insecurity can be deadly" to a new product. However, "IBM doesn't let its marketing people kill a new product by neglect," Stein said.

Once IBM irons out preliminary software bugs and teaches its marketing reps the best applications for the system — a process that could take three to five years — "the 8100 will catch fire and it will be dynamite."

Estimating that the 8100 will outsell all other CPUs in IBM's history, Stein said it should fulfill its intended purpose — to stop penetration by other minicomputer vendors into IBM's distributed marketplace.

This sort of one-stop-shopping is further accentuated by IBM's recent announcement of word processing equipment that will eventually be compatible with Systems Network Architecture (SNA). This means a word processing product used with an 8100 can eventually interface with similar products introduced by OPD, such as the Displaywriter system, a small, reasonably inexpensive word processing systems with data dictionary capabilities.



THE BUSINESSMAN'S BUSINESSCOMPUTER.

There are lots of computers. But there's only one rated by businessmen as tops in the small business computer class, according to an independent research firm survey. That's the Microdata Reality® business computer system. Reality rated 1st in all five major categories of comparison: 1. Performance 2. Reliability 3. Ease-of-Use 4. Backup support and 5. Service.

To win this high rating from businessmen, the Reality business computer system offers a combination of benefits offered by no other system.

Reality communicates in your business language—English® So you don't worry about codes and symbols decipherable to computer experts only.

Reality systems are modular. This means that your new Reality system can grow along with your business without the need for expensive application program changes and conversion costs.

And Reality is the most sophisticated business computer in its class with capabilities beyond most other systems.

All computers are NOT created equal. Before you decide, come face to face with Reality —the businessman's choice.

Find out for yourself. Call your local representative or toll-free 800-854-2003, ext. 814. In California dial 1-800-522-1500, ext. 814.
Microdata Corporation, P.O. Box 19501, Irvine, CA 92713.

REALITY®
from Microdata
"The Businessman's Choice."

User Approaches To Security Vary

(Continued from SR/20)

recommended to top management at the bank that computer security be upgraded. Top management then directed the Corporate Systems Department, of which Herbert J. Navarro is second vice-president, to establish a systems security policy and accompanying standards.

Of approximately 400 departments throughout the bank, it was determined that about 80 faced the gravest security needs, and they were chosen to develop risk analysis studies and disaster recovery programs, Navarro said.

The development of security programs for all 300 or 400 departments would have cost the bank $6 million to $8 million, while the lesser number could be accommodated for $2 million — a more palatable figure for the Systems Review Committee, which directs systems activities, sets standards and allocates money for computer systems at Chase.

Introducing The PTS-2000.

Your low-cost, expandable window to today's and tomorrow's 3270-type networks.

The PTS-2000 Series is Raytheon's brand new information display system for the Eighties.

In its initial configuration—available right now at prices up to 25 per cent below competition—the PTS-2000 system emulates the small-cluster 3276-type information display system. It is designed to support both binary synchronous and SNA/SDLC operating protocols. 9600 bps data rates. Screen sizes up to 3440 characters. And all of the advanced features you expect from a modern network terminal system: cursor select, 25th line, and total compatibility within a 3276-type network.

But there is where the similarities end. Because the PTS-2000 is designed to go far beyond alternative products of its class. It has far more intelligence, expandability, compactness, and upgradeability than any other 3270-type terminal system.

Soon it will be expanded to emulate 3274-type large-cluster systems, to support local disk drives for queued input, and to link Raytheon's VT word processors. Later, the family will grow even further—to become powerful SNA-compatible distributed processing, combined word and data processing, and network processing systems.

The PTS-2000 in 3276-mode operation is the start of an information display terminal family that will grow with your network needs far into the future. And with total compatibility and familiarity.

Get your first PTS-2000 system today. Call our PTS-2000 hotline at (800) 225-9975 or write to PTS-2000, Box 84, at our headquarters for more information.

Another Raytheon Intelligent Associate product.

RAYTHEON

RAYTHEON DATA SYSTEMS

Intelligent Terminals Distributed Processing Systems
Word Processing Systems Minicomputers
Telecommunications Systems

1415 BOSTON-PROVIDENCE TURNPIKE
NORWOOD, MASSACHUSETTS 02062

Distributed Minis Let Brewer Avoid Costly

OLYMPIA, Wash. — The acquisition of distributed minicomputer systems let the Olympia Brewing Co. here avoid an expensive upgrade of its IBM 370/135 mainframe while improving the productivity of its systems staff and its production-scheduling systems.

Olympia Brewing is the country's seventh largest beer maker with sales of $372 million in 1978, according to Wendell Carlson, director of information systems. The company has three breweries — one each in Washington, Minnesota and Texas.

'Heartland' Market

A few years ago, Olympia beer was sold only in the company's traditional West Coast "heartland" market. Today, both Olympia and Hamms are marketed in 26 states as far east as Florida, while Lone Star is sold throughout Texas.

According to Carlson, the minicomputer-based network has helped to make beer available when and where it's needed. This network of Data General Corp. Eclipse systems is the key to the distributed data processing (DDP) approach at Olympia's breweries in Olympia, Wash., and St. Paul, Minn.

By allocating production runs to incoming orders, Eclipse C/330s have moved the required order-scheduling information to the location where beer is produced and shipped, saving valuable time, Carlson said.

The C/330s are looked on strictly as "production machines," in that they support the daily plant-site operations. All development work for the minicomputer is done at the corporate information processing center. There the company has an IBM 370/135 mainframe, equipped with an IBM 3704 communications front end, and a DG Eclipse M/600 system.

Corporate CPUs

"We look on those two machines as the corporate computers. The M/600 is a market research tool that is used for interactive on-line problem solving," Carlson explained. This includes analysis of beer sales using graphics display terminals to project consumption trends in the brewery's product line. This research work on the M/600 is done using DG Dasher CRT terminals and Tektronix, Inc. 4014 graphics terminals.

To streamline the order processing functions, Olympia is in the process of a major upgrade that includes moving the product and order scheduling out from the 370 to the C/330s. The minicomputers presently are operating under DG's RDOS, using an IBM 3270 emulation software package from an independent software house.

Conversion of the C/330s from RDOS to the Advanced Operating System (AOS) environment is scheduled for late this year. The conversion of the Eclipse C/330s to AOS will give the plant site managers greater control over their DP scheduling needs.

Up to now, this scheduling work had to be done on the 370, which is running more than 500 hours a month, handling between 4,000 and 5,000 batch jobs. The production scheduling work had to be fitted into the 370's crowded job stream.

But when the conversion is complete, the C/330s will do much of their own production work, and then the results will be transmitted to the 370 using bisynch communications.

Solutions Near Problems

The DDP approach being implemented on the C/330s is based on the philosophy that it is best to "put the solution where the problem is," Carlson explained.

Whereas marketing and financial work are done at the corporate computer center using the 370 and the Eclipse M/600, it is more efficient to give individual plant managers control of their own destiny in regard to their individual processing needs, he added.

In the past, users had to install DP equipment and then tailor their business to meet the capabilities of the equipment but with the distributed processing approach, "we can install the hardware functionally and geographically where it is needed from a business

Why your next terminal should come from a communications company.

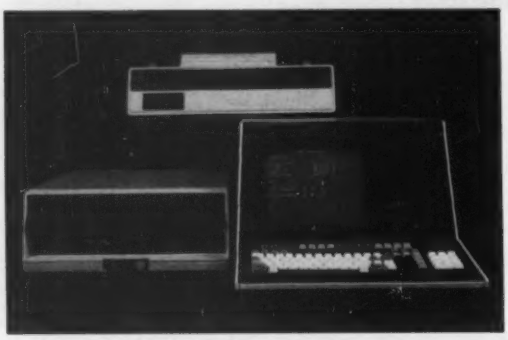
Think about it for a moment.

Your terminal can't be an island unto itself. It has to communicate with something, somewhere. In addition to the terminal's flexibility and power, you should consider how well it's going to perform within your whole communications network.

That's why your next terminal should come from Codex, a company that understands communications. We offer not only a wide range of terminal systems, but a complete line of data communications equipment including front-end processors, modems, multiplexers, and integrated network control systems. Most important, we offer the experience gained in over a decade of leadership in data communications – 15 years in which we've been making networks more efficient, more productive, and better able to serve the needs of people who need information. No other terminal manufacturer can make that offer.

And it also explains why we designed our CDX-68 Intelligent Terminal Systems the way we did – to give you full flexibility and power you need to manage your information.

A modular hardware design permits the CDX-68 to range in configuration from passive display terminals to stand-alone systems to sophisticated networks for distributed processing applications (with up to 56K bytes of user memory and up to 40 Mb of on-line data storage, as well as a variety of printers). An extensive array of software includes ANSI 74 COBOL, BASIC, FORTRAN, MPL, a macroassembler and the CODOS Disk Operating System. Communications can take place using a variety of protocols, including 3270, 2780, 3780, HASP Multileaving, and asynchronous disciplines.



For a terminal that communicates, turn to a company that understands communications. Codex is that company. We offer the broadest line of data communications systems and products provided by a single source: the whole universe of equipment that extends beyond your computer. For more information, call (602) 994-6580.

codex

A Subsidiary of MOTOROLA INC.

We'll get you through

member of IDCMA

Codex Corporation, 20 Cabot Blvd., Mansfield, MA 02048 • Tel: (617) 364-2000 • Telex: 92-2443
Codex Far East, 2-8, 1-chome, Yotsuya, Shinjuku-ku, Tokyo 160, Japan • Tel: (03) 355-0432
Codex Europe S.A., Av de Tervuren 158, 1150 Brussels, Belgium • Tel: (02) 762.23.51
ESE LIMITED, 1780 Albion Rd., Rexdale, Ontario, Canada M9V 1C1 • Tel: (416) 749-2271
Offices and distributors in major cities throughout the world.

Upgrade

standpoint," he said.

The installation of the C/330s has had other benefits for Olympia. By adding smaller processors at specific locations, the company has avoided the need to upgrade its 370 mainframe.

With the installation of first the M/600 and then the C/330s, Olympia has "frozen" the 370 configuration for the past two and a half years. According to Carlson, this has resulted in a hardware savings alone of $300,000 to $500,000 in the company's DP expenditures.

When the AOS conversion is complete, the C/330s will be able to communicate through the IBM 3704 frontend processor to the 370/135. The 370 is the central point of the network, with the other machines exchanging data with the mainframe.

The C/330 at the Tumwater plant operates as a remote processor even though it is located in the same building as the corporate computer center. By using modem simulators supplied by Teleprocessing Products, Inc., the local C/330 can be connected directly to the mainframe — thereby avoiding

The DDP approach being implemented on the C/330s is based on the philosophy that it is best to "put the solution where the problem is."

telephone charges, but still allowing the minicomputer to look like a remote processor to the 370.

The St. Paul site uses AT&T private lines and Paradyne Corp. M90 modems. The 9,600 bit/sec capability of the M96 usually is split into two 4,800 bit/sec lines to handle data transmission needs between the two sites, Carlson said.

Olympia has a staff of 13 programmers performing systems development work on the various applications. The C/330 production scheduling system is being developed on the Eclipse M/600 using DG's Cobol implementation, while the market research applications are coded on the M/600 in fortran 5 and DG's PL/I language, based on the 1976 PL/I standard. Programs being developed on the 370 are written mostly in PL/I with some Cobol.

A total of 63 terminals are installed at Olympia with 47 Dasher CRTs, three Tektronix, Inc. graphics terminals and some IBM 3270 CRT terminals in use.

The M/600 will also be able to transmit data to the 370 in the same manner as the C/330s. With this approach, it will be possible to develop programs for the minis on the M/600, while all testing with the 370 can be done without tying up the production machines, Carlson said.

'Computer Reject Your Program Again, Ed?'

The brewing process is monitored by the control panel at left.

Some of the best minds in the software business will be writing for *Computerworld Extra!*

And the best minds in the DP business will be reading it!

***Computerworld Extra!* is a new concept for *Computerworld*, a new service for our 535,000 readers*, and a new vehicle for your advertising.**

Computerworld Extra! is an extra issue of *Computerworld* — our first ever — to be published this September 17th. It will appear in what our Editor, Drake Lundell, calls a "tabazine" format. This means glossy, full-color covers on the outside, and a magazine format inside — but tabloid-size throughout.

Computerworld Extra! will also be different in its focus. The entire issue will be devoted to one subject: "Software Systems in the '80s," and it will contain articles by some of the world's leading authorities on the subject, including Tom Meurer, Dixon Doll, Stephen Robinson, Dan McCracken and the experts at Auerbach Publishers and Datapro Research.

Topics to be covered will include The Bright Future of Applications Software Packages; the State of Utility Software, Data Communications Software Trends in the '80s and What's Ahead in Distributed Data Processing Software. Special emphasis will be given to one of the hottest areas of computer software — data base management systems.

Computerworld Extra! will be received and read by 105,000 paid *Computerworld* subscribers (ABC 12/31/79) and 430,000 pass-along readers (Becker Research Corporation). These readers include the Vice Presidents, Directors, DP Managers, and other MIS professionals who are responsible for the vast majority of all the data processing management information systems in America. They are the decision makers for well over $2 billion in annual expenditures on software, and they rank *Computerworld* as the most useful publication they receive — by more than 3 to 1 (Becker Research Corporation).

We'd be glad to give you more information on advertising in this new publication from *Computerworld* — as well as complete details on our subscribers and readers. Just contact your local CW Sales office, or call Roy Einreinhofer, Vice President, Marketing, CW Communications/Inc. at (800) 343-6474.

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

A publication of CW Communications/Inc., the world's leading publisher of computer-related newspapers and magazines.

Sales Offices: **Boston**, 375 Cochituate Rd., Framingham, MA 01701, (617) 879-0700; **New Jersey**, Paramus Plaza I, 140 Route 17, North Paramus, NJ 07652, (201) 967-1350; **Chicago**, 230 North Michigan Ave., Chicago, IL 60601, (312) 782-7565; **San Francisco**, 353 Sacramento St., Suite 600, San Francisco, CA 94111, (415) 421-7330; **Los Angeles**, 3420 Ocean Park Blvd., Suite 3020, Santa Monica, CA 90405, (213) 450-7181.

IMPROVE YOURSELF (Or Your Money Back)

Computerworld has a lot of information, but it can't give you everything you need to know.

That's why there are Computerworld Books. Selected by our editors for their relevance to DP manager's needs, Computerworld Books give you important information to help you stay ahead. And with our no-risk 15 day trial offer, you get a chance to try before you buy.

Look over the selection below and enter your order today.

WJ040. **PROJECT MANAGEMENT.** Melvin Silverman.

Called "...a highly effective tool for turning technical experts into management experts," this course takes you step-by-step through every aspect of what you need to know to become a competent project manager. Includes details on how to pick a team of section managers and command their loyalty — how to jump from planning to controlling — how to finance and budget — how to cope with management — and much more. $39.95

NV004. **CDP REVIEW MANUAL: A DATA PROCESSING HANDBOOK.** Kenniston W. Lord, Jr., CDP and James B. Steiner, CDP. A Handbook that encompasses all major subject areas in EDP and provides a complete review manual to help candidates prepare for the Certification in Data Processing (CDP) Examination. The handbook is specially designed for self-instruction and self-testing by people interested in moving up the EDP management ladder. $19.95

NV016. **WRITTEN COMMUNICATION FOR DATA PROCESSING.** Randi S. Smith. Easy-to-follow guidelines tell you how to master the written communication skills necessary for systems development, operations, modification, maintenance and management. You gain techniques for writing the six kinds of memos used in the field and solutions for the writing problems inherent in the stages of the data processing life cycle. $16.95

WJ032. **WRITING FOR RESULTS IN BUSINESS, GOVERNMENT, THE SCIENCES AND THE PROFESSIONS.** David W. Ewing.

How to put your ideas across in writing, clearly and forcefully. This new edition of a best-seller makes learning to write faster and easier. $18.95

WJ035. **FINANCE FOR THE NONFINANCIAL MANAGER.** Herbert T. Spiro. This guide has been tailor-made for the nonfinancial manager who now needs a working knowledge of finance to handle new responsibilities. You'll learn the essential techniques of dealing successfully with money problems and financial people. You'll also get a glossary, 40 charts, a table giving you Present and Future Value of Sums and Annuities and 28 other tables. $18.95

NV017. **DATA PROCESSING COST REDUCTION AND CONTROL.** Dick H. Brandon. Expert, valuable help for cost reduction and control in day-to-day operations provided by an outstanding computer specialist. More than 110 specific guidelines for cost savings as well as general approaches to cost cutting and productivity improvement. An effective tool for management in a contracting environment and for operating a leaner organization. $17.95

NV018. **DATA PROCESSING CONTRACTS: STRUCTURE, CONTENTS AND NEGOTIATION.** Dick H. Brandon and Sidney Segelstein.

A detailed framework for structuring and negotiating airtight contracts that clearly stipulate the responsibilities of both user and vendor. More than 250 specific contract clauses included, with risk ratings and fall-back alternatives. $34.50

NV020. **MICRO-ANALYSIS OF COMPUTER SYSTEM PERFORMANCE.** Boris Beizer. Step-by-step techniques to improve computer performance are provided in an easy-to-follow approach to the construction, validation, and use of analytical models. Only analytical (e.g. algebraic) methods and closed-form expressions or such expressions that can be programmed with ease, are included. In a compact section on the most useful results of queueing theory you get an explicit guide to applicability of the various formulas. $22.50

NV013. **FORTRAN 77.** Harry Katzan, Jr. Here's a detailed presentation of the new FORTRAN standard. This handbook fully defines FORTRAN's broadened applications in areas such as input/output facilities, subprogram facilities, and the use of integer expressions. $18.50

WJ036. **HOW TO READ A FINANCIAL REPORT,** short, non-technical, practical guide that explains, step-by-step, the basics of the three key statements in financial reports — the balance sheet, the income statement, the cash flow statements and the relationships between them. The concept of cash flow is emphasized and unnecessary information on accounting or bookkeeping procedures is avoided. A carefully designed exhibit at the beginning of each chapter and practical company examples help you get a better idea of where a company has been and where it is headed. $12.95

NV021. **MARKETING MANAGEMENT INFORMATION SYSTEMS.** William R. King. Stressing the importance of convenient and usable data, this book provides proven techniques for supplying information to support marketing management. Attention is given to system's usefulness and its relationship to other organizational information systems. A detailed conceptual framework for MMIS uses is also included. $14.95

NV012. **DATA PROCESSING ORGANIZATION AND MANPOWER PLANNING.** Dick H. Brandon. This book provides guidelines for structuring the data processing organization and planning for the selection, development and promotion of personnel. There's helpful coverage of personnel selection criteria, hiring, training and management functions and responsibilities. Also included are useful interviewing techniques and tests. $18.95

NV014. **IMS PROGRAMMING TECHNIQUES: A GUIDE TO USING DL/1.** Dan Kapp and Joseph F. Leben. Here are easy-to-use methods for writing application programs in ANS COBOL, PL/1, or Assembler Language in a data base environment. This book focuses specifically on the IMS family of data base management systems supplied by IBM. It starts from scratch and assumes no prior knowledge of IMS or any other data management system. $17.95

WJ042. **THE ART OF SOFTWARE TESTING.** Glenford J. Myers.

New ideas and techniques for finding and eliminating software bugs. Includes practical advice on the management aspects of testing, test tools, highest order testing, debugging and code inspections. $17.95

BP023. **A MICROPROCESSOR COURSE.** Mark C. Fohl. A clear, easy-to-follow explanation of the operation and application of the microprocessor. Using the Motorola 6800 as an example, the book covers several topics fundamental to all computers and provides a thorough coverage of the basics, through devices and subsystems, to complete computer systems. $15.00

BP261. **INCREASING PROGRAMMER PRODUCTIVITY THROUGH LOGIC DEVELOPMENT.** Gloria H. Swann. Every individual programmer should know how to write the logic for each of the basic types of programs in the most efficient manner, while linking the functions together when required. Using a cookbook approach to logic development of programming problems, this book cuts the time required for anyone to become an "experienced" programmer and gives an understanding of the design philosophy and the technical aspects of logic development. $12.50

WJ030. **MOVING UP QUICKLY.** Thomas L. Weck.

"...a gold mine for those of us who must deal with the process of change in a mobile corporate world." Succinctly describes the necessary steps in searching for and finding the right job. "Thorough, concrete and practical." $12.95

WJ034. **COMMUNICATING AT THE TOP: WHAT YOU NEED TO KNOW ABOUT COMMUNICATING TO RUN AN ORGANIZATION.** George de Mare. This book takes the mystery out of corporate communications and gives you the knowledge, skills and techniques you need to reach and influence others — clients, colleagues, employees, stockholders, government and the financial community. The book includes many illuminating (and entertaining) examples that demonstrate essential techniques at work in actual situations. $17.95

NV008. **DATA PROCESSING PROJECT MANAGEMENT.** Thomas R. Gildersleeve. Numerous guidelines cover every phase of DP project management — from formulating a plan to relating the plan to cost estimates and future development activities. The author's limited commitment, phased approach to developing a DP system helps you as a project leader. $18.95

BP027. **EXECUTIVE HANDBOOK TO MINICOMPUTERS.** Robert A. Bonelli. This book covers the basics of minicomputers in non-technical language for those professionals who are responsible for purchasing minicomputer products and services. $12.00

BP024. **ADVANCED SOFTWARE DESIGN TECHNIQUES.** R.J. Rader. Beginning with fundamentals, this book gives all the techniques that will assure good — and simple — software design, including linear linked lists, binary trees, recursion, backtracking, formal methods of decomposition, and dynamic programming. Contains a valuable collection of illustrative programs to help readers produce better programs faster. $15.00

NV019. **REDUCING COBOL COMPLEXITY THROUGH STRUCTURED PROGRAMMING.** Carma McClure. By eliminating the confusion surrounding programming for business, this book saves you both money and countless hours of programming time. Although the emphasis is on COBOL programs, most of the book is applicable to any higher level programming language. $13.95

MAIL THIS NO-RISK ORDER FORM TODAY!

Mail to: **Computerworld Books**
925 North Milwaukee Ave., Wheeling, IL 60090

Please send me the following book(s):

Code	Quantity	Title	Total Price

Add $1.25 shipping and handling for one book and 75¢ for each additional book. If your check is enclosed, we pay shipping cost.
Total cost (Illinois residents add 6% sales tax) _____

15-Day Free Trial! I may read the books for 15 days, and, if not satisfied, return them, and you will refund my money.

☐ Check enclosed ☐ BA/Visa ☐ MC (MC only — List four digits above your name)

If a charge, we need your signature _____ Expiration Date _____

☐ Bill my company (Purchase order enclosed)
☐ Bill me (include company name)
(Payment must accompany overseas orders)

Name _____

Firm _____

Address _____

City _____ State _____ Zip _____

Computerworld Books DM4281

With IBM 3790-Based Net

Farmers' Co-op Reaps Better Grain Accounting

Special to CW

INDIANAPOLIS — Millions of bushels of grain move through facilities of the nation's farm cooperatives and accounting for it places a heavy and growing burden on the cooperatives' personnel.

Indiana Farm Bureau Cooperative Association (IFBCA) has therefore installed IBM 3790s linked to a 370/158 to help lift the clerical work load and make grain accounting swifter, surer and easier.

IFBCA is moving rapidly with a distributed processing system designed to ease the grain accounting and grain management headaches of its county cooperative members. In fact, the system decentralizes computer power to the county cooperative levels to support day-to-day operations, while maintaining centralized programming, technical services and large-scale computer processing at the state association level.

Key Element

The key element in IFBCA's distributed processing approach is the IBM 3790 Communications System, according to Larry E. Berg, systems manager for member services. "The 3790, placed at the county co-op facilities, provides stand-alone computer power to process grain transactions as they occur; keeps track of receipts, contracts, inventories, prices and shipments; and supplies the management information needed on a daily basis.

At the same time, the 3790 can communicate directly with the IBM 370/158 host computer here to facilitate large month-end and year-end data processing," he explained.

To date, the 3790 systems have been installed by four of IFBCA's county cooperative members. The four members have fully implemented the distributed processing system's key grain accounting application, and the advantages that have accrued to the county cooperative's personnel and management, and indirectly to their farmer patrons, are impressive, Berg claimed.

"Performing as the individual county cooperative's own in-house computer, the 3790 supports every facet of the grain operation, expediting the transactions and keeping detailed records of grain receipts, patron contracts, patron grain bank deposits, terminal contracts and shipments," he noted.

"And it offers on-line data processing capabilities so that county personnel can inquire into the records at any time for current information on a particular patron or contract or on overall grain inventory or position. The result is greater operating efficiency and more responsive management."

Transaction Processing

Data used by the 3790 to maintain the updated grain activity records is entered on-line as the transactions occur. Each of the county co-ops now using the system has at least two IBM 3270 visual display terminals linked to its 3790.

Transaction details are keyed in on the terminals just once. The system captures the data, then uses it to update all related records, initiate subsequent processing and produce needed documents and reports, eliminating a lot of paper handling and manual record duplication.

For example, the one-time entry of a scale ticket causes the system to calculate net weight, dock pounds and net bushel, bushels shrink and/or dryer charge and the price discounts for each grade factor. It then provides that total discount, the transaction bushels total and transaction value.

A single scale ticket can be split by the system to multiple farm patron accounts, and a ticket also can be split between market and contract, if necessary. The system ensures that scale ticket transaction data is entered only once via an edit routine, and it ensures that no scale ticket is missed by producing a missing ticket numbers report.

This same single entry/multiple processing feature applies in all other types of transactions on the 3790. Entry to a patron contract, for instance, will apply the contract, update the patron balance (payable, storage and so on), then update the grain inventory and position records. It will also provide input for a daily summary report of contracts written by type, by commodity, by department, separated by "elevator" and "direct" contracts.

Regardless of transaction type, the 3790 edits and validates all data on input and the county cooperative establishes its own guidelines for price ranges, grade factors, crop dates and the like, which are built into the system. Activity reports are produced daily for each transaction type, providing an audit trail for reference and control purposes.

Settlement checks are printed by the 3790 and a settlement advice detailing the transaction is provided daily for all patrons who have requested a settlement. At any time during the day, a position and inventory report can be produced showing the position as of the last transaction entered. This is shown by commodity within departments and indicates the new long or short position for each commodity.

(Continued on SR/33)

"StatMux"

From The DCC Data Movers

Our STAT MUX can *reduce your communications costs* by combining multiple costly circuits into one circuit, and *improve reliability* with error-free transmission. DCC's Data Movers currently service major operating U.S. Networks.

The CM-9100 Statistical Multiplexer offers:

- **4 to 32 subscriber lines**
- **Synchronous or Asynchronous input protocol**
- **X.25 Level 2 support**
- **Built-in diagnostics**
- **Optional High Speed backup line**
- **No impact to existing terminals, computers, or software**
- **Many other standard and optional features**

Immediate Delivery!

For further information contact the Data Communications Marketing Department.

DCC

Digital Communications Corporation

A M/ACOM Company

11717 Exploration Lane
Germantown, Maryland 20767
(301) 428-5600 TWX 710 828-0541

Atten: Data Com Marketing
Please send me more information on DCC's Data Movers.
Name
Address
City
State Zip

DCC
11717 Exploration Lane
Germantown, Maryland 20767

MFE/IV
HASP
2780/3780
WORD PROCESSING
CENTRAL INQUIRY
HIERARCHICAL
SNA/SDLC
3270
DATA ENTRY
COBOL PROCESSING
RING
MULTI-STAR
STAR
MFE/IV

The Multifunction Edge

Four-Phase gives you the widest choice of network planning tools.

All backed by IBM-compatible network experience.

The one system that does the work of several.

Typically, any good sized organization needs multiple displays at outlying locations to do data entry, local and remote inquiry, word processing and a small amount of COBOL local processing. The powerful MFE/IV™ Multifunction Executive system from Four-Phase lets you combine all these functions with IBM-compatible batch and interactive communications. All on one system. All at once.

MFE/IV protects your investment by adding capacity without adding to central system overhead. You can choose just the right combination of hardware and ready-to-run software you need at each user site, and link them to your chosen central mainframe location. With MFE/IV you can build a unified system network—sharing data, resources and processing between your central mainframe and your remote user locations.

Field-proven, MFE/IV systems install easily in hours, and that means a substantial savings in development time alone.

Hundreds of networks up and running.

For more than ten years, Four-Phase has been successfully installing distributed processing in IBM-compatible networks. We support the current line disciplines and terminal characteristics, and we have an ongoing commitment to support new communications technologies.

Our headquarters trained systems engineers are available at local offices nationwide for network planning, installation, customer education and continuing software support.

Ask for a demonstration.

Let us show you how to get The Multifunction Edge. For a personal demonstration, return the coupon below or call your nearby Four-Phase Systems office. Also available through Four-Phase Systems, Ltd. in Canada and distributors throughout the world.

Yes, tell me more about **The Multifunction Edge.**

☐ Please arrange a demonstration.
☐ Please send information.

My present mainframe and terminals are _____

_____

Name _____

Title _____

Company _____

Address _____

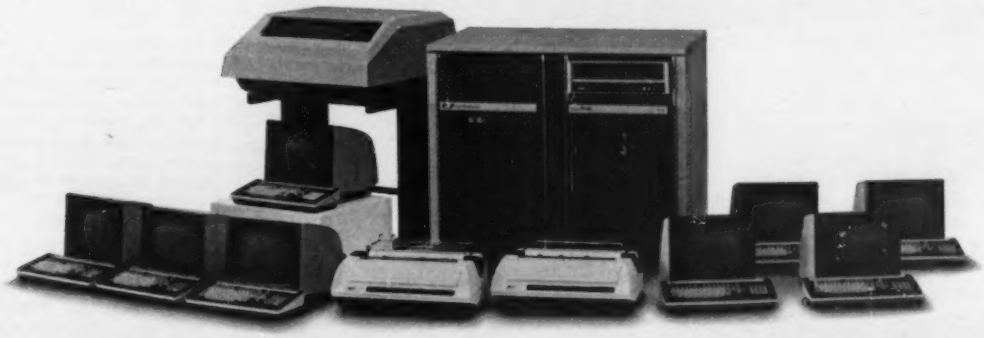
City _____ State _____ Zip _____

Telephone _____

CW 7/28/80

Four-Phase Systems, Inc. MS 42-1B8-M
10700 N. De Anza Blvd., Cupertino, CA 95014
Telephone 408/255-0900

MFE/IV is a trademark of Four-Phase Systems, Inc.



Four-Phase Systems
The Distributed Processing Company

Manager Cites Continuity as Primary Issue

By a CW Staff Writer

DUBUQUE, Iowa — How does distributed processing affect the information systems manager in terms of his control and responsibility?

Assuredly, there are as many answers to the question as there are distributed environments, but one of the issues faced by managers of distributed networks is certainly "maintaining continuity across the board."

That, at least, was the central problem cited by Donald W. Landa, DP manager for Flexsteel Industries, Inc., a furniture manufacturer here, who has managed a distributed environment since the early '70s.

Different Views

"Every division would like to have something just a little bit different," he explained, "just because — if for no other reason — you've got different people in different locations.

"Everybody's got a different idea about something, so that's probably the major obstacle we have to work with in maintaining continuity," Landa said.

On the whole, the system is "working very well," Landa said, although he now has "much more" responsibility than he had in a nondistributed environment.

"The environment we're working in has exploded, so to speak, into not having just one processor up, but six — five IBM System/32s and a 3741, and these batch-communicate with our system here in Dubuque," Landa explained. The central site has an IBM 370.

On the System/32s, four of which do the batch telecommunications, and on the 3741, the company uses operator-type personnel. The programming, in RPG-II is done on a central basis in Dubuque and the applications running on the System/32s "are paralleling [ours] across the board, but the divisions still have the ability to have their own unique type of things," he added.

"So from that aspect of it, I'd say we've got more responsibility here and also from the software maintenance standpoint," Landa said.

Such files as inventories and dealer master information are "strictly on the central location here in Dubuque, and that's why we have the batch communications. The edit functions and the master files the divisions use are here on the 370 to maintain a central base of products and product information across all divisional lines," Landa said.

Divisional Responsibilities

Such functions as job processing and order entry, however, are the responsibilities of each of the divisions. They transmit on a daily basis to the central site, which returns processed data in a summary-type format, Landa explained.

"When you get into such things as payroll, accounts receivable and accounts payable, which are identifiable each to their own divisions, the divisions are responsible for their own," he continued.

"So, in the strict sense of the word, the processing we do for the other divisions — even in the environment we have — we still do on the 370 as we've always done them," he explained. "It's just that we've allowed the systems in the divisional areas to do some types of work for themselves under central control.

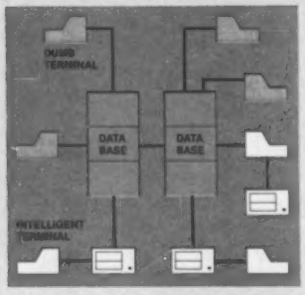
"We can pull from their base of information, and we can work back and forth with it. So while we're doing work here, they're doing parallel kinds of work on the System/32s and we still maintain the central base of inventory information," he said.

Expanding on the efficiency and effectiveness of the distributed system, Landa noted that "Those people out there basically know the jobs they need to have done, and they know every division cannot afford to have its own programmers. I think they are fairly happy with the things they've got going on.

"At the same time, we've been able to improve from the standpoint of the volume of work we can do utilizing the system; the amount of data we can pass back and forth between systems is much enhanced, and we plan to even enhance that further by getting more data handled utilizing the systems in the distributed environment," he said.

Microcomputing comes of age.

Ohio Scientific's OS-65U Level 3 operating system software brings new networking and distributed processing capabilities to microprocessor based computer systems.



Until now, the only alternative for low cost multiple-user computer applications was time-shared systems. However, a serious drawback of microcomputer or minicomputer multi-user time-share systems is the fact that under heavy work loads they slow down to a crawl since the central processor time in such a system is shared by all of the users.

In a microprocessor based distributed processing system, using floppy based microcomputers as intelligent terminals (local systems) most of the work load is handled locally. Overall system performance does not degrade under heavy job loads. Each local system performs entry, editing and execution while utilizing the central data base for disk storage, printer output, and other shared resources.

For more demanding applications it is desirable to have several data bases, each with its own collection of local systems. Such an inter-connected set of data bases is called a network. Each data base and its local intelligent and dumb terminals is called a cluster.

Level III

OS-65U Level 3 now supports this advanced networking and distributed processing capability as well as conventional single user operation and time-sharing. Level 3 now supports local clusters of intelligent microcomputer systems as well as dumb terminals for the purpose of utilizing a central Winchester disk data base and other shared resources. The system also has full communications capability with other Level 3 data bases providing full network capability.

The system utilizes Ohio Scientific's low cost, ultra high performance computer systems throughout for intelligent terminals as well as data bases. This general systems configuration provides a cost/ performance ratio never before attained in this class of computer power.

Level 3 resides in each network data base. A subset system resides in each intelligent terminal. Each data base supports up to 16 intelligent systems and up to 16 dumb terminals. However, since dumb terminals can heavily load the system, they should be kept to a minimum. Level 3 also supports a real time clock, printer management, and other shared peripherals.

Data Base Requirements

Minimal requirements for a Level 3 network data base are a C3-C or C3-B computer system with 23 or 74 megabytes respectively, console terminal, 100K bytes RAM and a CA-10X 16 port I/O board for network and cluster communications.

Intelligent Terminal Requirements

Any Ohio Scientific 8" floppy based computer with 56K RAM and one data base communications port.

Connections

Intelligent terminals and networked data bases are connected by low-cost cabling. Each link can be up to 10,000 feet long at a transfer rate of 500K bits per second, and will cost typically 30¢ a foot (plus installation).

Syntax

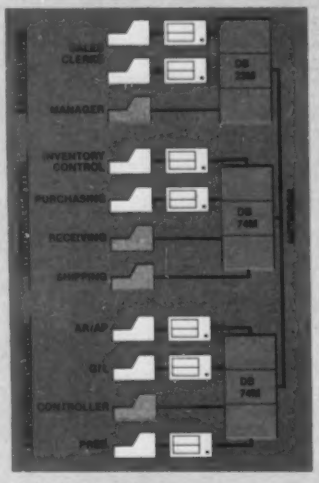
Existing OS-65U based software can be directly installed on the network with only *one* statement change! Level 3 has the most elegantly simple programming syntax ever offered on a computer network.

File syntax is as follows:

DEV A,B,C,D.	Local Floppies	} unchanged from single user and timeshare systems
DEV E	Local hard disks	
DEV K-Z	Specific network Data Bases	

Each of up to 8 open files per user can be from 8 separate origins. Specific file and shared peripheral contentions are handled by 256 network semaphores with the syntax Waite N Waite N, close.

The network automatically prioritizes multiple resource requests and each user can specify a time out on resource requests. Semaphores are automatically reset on errors and program completion providing the system with a high degree of automatic recovery.



A Typical System

A typical system with two network data bases will have 148 megabytes of disk, four intelligent subsystems equipped with dual floppies, two dumb terminals, a word processing printer, a fast line printer, network data base manager software and 1000 ft. of interconnecting cable. Utilizing .7 MIPS processors throughout it will cost less than $50,000 plus installation. GT option computers (1.2 MIPS) can be utilized at a slightly higher cost.

One Step at a Time

Best of all, Ohio Scientific users can develop distributed processing systems economically one step at a time. A user can start with a single user floppy system, add a hard disk, then time-sharing, then a second Winchester data base for backup and finally cluster intelligent terminals to achieve a full network configuration.

For literature and the name of your local dealer, CALL 1-800-321-6850 TOLL FREE.

OHIO SCIENTIFIC
1333 SOUTH CHILLICOTHE ROAD
AURORA, OH 44202 • (216) 562-3101

New Solution to Old Problems

Distributed System Speeds Welfare Benefits

Special to CW

MADISON, Wis. — Delays in determining applicant eligibility for economic aid and inconsistency in applying eligibility and benefit rules are old problems common to the administration of most government welfare programs.

In Wisconsin, however, a distributed system is reducing these and other problems while saving money for the state.

The system is a Computer Reporting Network (CRN) using IBM 8100s linked to an IBM 3033. It reduces the time lag between application for aid and eligibility and benefit determination and ensures equal welfare treatment statewide because the same policies are applied to individual client information regardless of which worker in any of the 72 counties or four Indian tribes takes the application.

"These were primary goals in creating the Computer Reporting Network," according to Bernard Stumbras, administrator of the Division of Economic Assistance of the state's Department of Health and Social Services.

"Results to date have exceeded expectations. The time required to determine an aid applicant's eligibility and benefit amount has been slashed by 50%. And the system applies eligibility criteria with absolute consistency, time after time," he added.

"But these are by no means the only contributions of the new system," Stumbras continued. "Our Economic Assistance Program is locally administered and state-supervised, and the distributed system eliminates a vast amount of clerical paperwork at both the local and state levels. The often overburdened eligibility technician, whose time is now freer to work with clients, is a major beneficiary."

Twenty 8100s

IBM's 8100 Information Systems are key elements in the CRN, according to Paul Pecorin, director of Office Information Systems for the Department of Health and Social Services.

"We now have 20 of the 8100 systems installed at local offices around the state," he said.

"Each of the 8100s is linked via phone line to an IBM 3033 host computer at the state's data center here. Each is similarly linked to its own satellite group of smaller local offices which are equipped with on-line visual display and printer terminals.

The 8100 systems at the local level and the host computer interact to control and expedite the processing of all aid applications and eligibility determinations. The 8100s pre-edit, organize and transmit application data. The host computer performs additional edits and validity checks, determines applicant eligibility and benefits and transmits its findings back to the local 8100.

Combined Form

Basic to this interaction is a combined application form that the state has developed to capture applicant data relating to the three types of economic assistance processed by the computer: Aid to Families with Dependent Children, Medical Assistance and Food Stamps.

The switch from three separate applicant forms to the combined form, together with the common data manipulation made possible by the new distributed system, will save the state an estimated $1 million annually.

Working from the combined application form, the local level terminal operators use on-line CRT terminals to enter the applicant data into the local 8100 system. The system guides the terminal operator step-by-step through the data entry process and data is edited as entered. If an error is found, the 8100 displays an error report.

If the data entry passes the edit checks, and if the host computer is currently available, the 8100 transmits the application to the host. Should the host not be currently available, the 8100 queues and stores the application data that has passed the pre-edit to be sent on as soon as the host does become available.

"The ability of the 8100 to queue and store transaction data is vital," Pecorin said. "The entire application/determination processing cycle starts at the local level and we simply cannot allow application data entry from the local level to be shut off because of the temporary unavailability of the host computer," he explained.

The host computer has many functions in the distributed system. Applicant data coming in from the 8100s at the local offices goes first to a daily activity data base which the host sets up, controls and then draws upon, as needed, to initiate eligibility and benefit determination processing.

To start this process, the IBM 3033 computer accesses a "Case" data base, which it also maintains, and which stores updated records of some 100,000 AFDC, Medical Assistance and Food Stamp cases. A case is a welfare household and includes each person in the household (averaging about three) associated with the case.

The host computer first checks to de-

(Continued on SR/33)

The mighty mini

You can read how small computers are reshaping the business world and what they can do for you in COMPUTERWORLD'S August 25th Special Report.

Edited by Tim Scannell, this Special Report, "Minicomputers & Small Business Systems," will take a good look at every kind of small computer from micro-based desktop computers to the so-called "superminis" that can do the work of the traditional mainframes.

You will see how the revolutionary changes in the small computer world have had a big impact on the way businesses function. And, you'll learn more about how these marvelous machines can benefit you, in articles on selecting minis and small business systems as well as protecting them against fire, sabotage and other disasters. Plus, information on privacy and protecting data. We'll also be taking a look at:

- *To what extent do existing personnel need to be retrained with the introduction of minicomputers?*
- *How can minicomputers make middle managers more effective in reaching corporate objectives?*

With tutorials and application stories, you'll have the most comprehensive up-to-date information available. And if you're a manufacturer or dealer in minicomputer equipment, you'll want your ad there. Don't forget, ad closing date is August 8th. Call your *Computerworld* salesman for more information and complete assistance in ad planning. Or, to place an ad, call Frank Collins at (617) 879-0700.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston	Chicago	New York	San Francisco	Los Angeles
Bob Ziegel	Tom Knorr, Jr.	Don Fagan	Bill Healey	Jim Richardson
Chris Lee	Bob Ziegel	Mike Masters	Barry Milione	Bob Hubbard
Ed Marecki	Jane Wrightman	Peter Senft	Bob Stetson	Kathy Knox
Kathy Doyle	(312) 782-7565	Candy Kelly	Ruth Gordon	(213) 450-7181
Susan Wolffe		(201) 967-1350	(415) 421-7330	
(617) 879-0700				

But Survey Finds Variances Between Industries

DDP Users Rate IBM Compatibility Important

ELLICOTT CITY, Md. — Compatibility with IBM hardware and software is viewed as somewhere between "important" and "vital" in a significant number of distributed data processing (DDP) installations, according to a survey of information processing executives compiled through May.

The survey was conducted by Impact Marketing Services. All statistics are based upon some 97 responses to questions concerning various questions about DDP.

After being related to the total number of responses to a particular question, the answers were broken down by data communications needs, number of DDP sites and the economic sector of the respondents' organizations.

The "economic sector" classification included manufacturing, wholesaling, retailing, financial services, insurance, transportation, DP services, government, education and an "other" category.

Data communications needs were defined as international, national, regional, local or nonexistent.

Number of sites was broken down as follows: 25 or more, 11 to 24, six to 10, three to five, one or two and none.

Eighty-three percent of the respondents described IBM compatibility as mandatory (58%) or desirable (25%) in a DDP environment. The remainder of the respondents said IBM compatibility is not necessary.

When analyzed on an economic-sector basis, the findings revealed strong variances between various industries in the degree to which IBM compatibility is deemed mandatory or desirable. For example, 81% of responding firms in the insurance industry indicated such compatibility was mandatory. However, only one-third of the 12 firms in the transportation sector felt the same way and all three of the government agencies included in the survey agreed that IBM compatibility is not necessary for DDP installations. (See chart for complete breakdown by industry.)

The relationship between organization size and DDP flexibility reflected by users was based upon the number of DDP sites within the organization.

ECONOMIC SECTOR	IBM COMPATIBILITY IS MANDATORY.	IBM COMPATIBILITY IS DESIRABLE.	IBM COMPATIBILITY IS NOT NECESSARY	TOTALS
Manufacturing	13	2	3	18
Wholesaling	4	1	2	7
Retailing	6	1	1	8
Financial Services	7	5	1	13
Insurance	13	3	0	16
Transportation	4	6	2	12
Data Proc. Services	1	1	0	2
Government	0	0	3	3
Education	0	1	1	2
Other	5	3	2	10
TOTALS:	53	23	15	91

Importance of IBM Compatibility In DDP Environment — Economic Sector Basis

Data Communications

From the viewpoint of data communications requirements, the groups surveyed concurred with the importance of IBM compatibility. A slightly greater degree of freedom was expressed on this issue by firms with local or regional data communications requirements than by users requiring national and/or international data communications services. Forty-four percent of the former group expressed the view that IBM compatibility was not mandatory vs. 39% of the larger data communications user groups that shared this opinion.

The relationship between organization size and DDP flexibility reflected by users was based upon the number of DDP sites within the organization. Forty-five percent of the users with 10 or fewer sites felt that IBM compatiblity was not madatory as opposed to 39% of the respondents with 11 or more sites. Only one group — those having three to five sites — had a majority that indicated IBM was not mandatory, although one-third of the 18 respondents in this group said it was desirable.

When the same group of respondents was asked to indicate which of three choices most closely approximated the need in their respective organizations for "complete" DDP systems, the same percentage (83%) that considered IBM compatibility as mandatory or desirable indicated that any new DDP system would be required to interface with presently installed systems. Approximately 12% indicated that new DDP systems would probably be used to replace currently installed systems and just 5% planned for new DDP systems to be completely isolated from present systems with no plans for future interfaces.

Wholesaling Sector

All of the individuals in the wholesaling sector and 15 of the 16 insurance respondents expressed the belief that DDP systems would have to interface with present systems. The only significant difference within the industry breakdown — that interface would be required of any DDP system — was expressed by three of the eight retailing representatives who felt that new DDP systems would replace present systems in their organizations.

Network size appears to have little impact on the responses when the question about interface requirements is viewed on the basis of an organization's data communications needs.

Eighty-six percent of those firms requiring national or international services were concerned with interface capabilities of DDP systems and 80% of those firms with regional, local or nonexistent data communications networks expressed the same concern.

transcomm

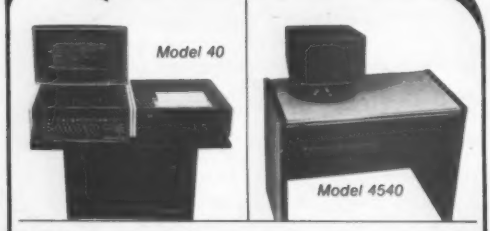
BUSINESS APPLICATIONS
TOLAS – II
DEC RSTS/E
ICP Million Dollar Award Winning Products, from the World's *First* Commercial RSTS Service Center.

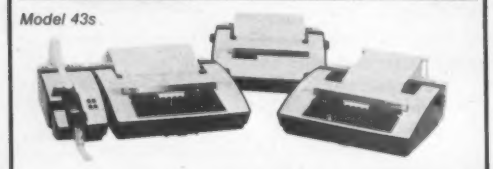
DISTRIBUTION SYSTEMS
- Order Entry/Invoicing
- Inventory Management
- Sales Analysis
- Purchasing

FINANCIAL SYSTEMS
- Accounts Receivable
- Accounts Payable
- Financial Reporting + FINAR
- Payroll • Fixed Assets

TRANSCOMM DATA SYSTEMS
412-963-6770 1380 Old Freeport Road Pittsburgh, PA 15238
415-433-7123 San Francisco, CA
AUTHORIZED DIGITAL COMPUTER DISTRIBUTOR

TELETYPES®





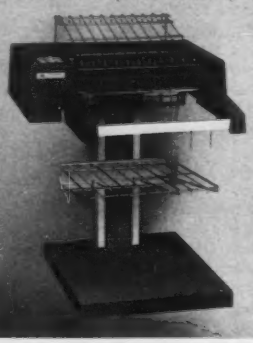
Models 40, 43 and 4540 for:
- Switched network
- Point-to-point private-line
- Multi-point private-line
- Both asynchronous and synchronous

FEDERAL Communications Corporation
11126 Shady Trail, Suite 101, Dallas, Texas 75229
214/620-0644 TELEX 732211 TWX 910-860-5529

Exploit the full capacity of your high-speed printer with FORMSTACKER®

High-speed printer downtime for paper jams, misfolds and tangles is totally eliminated with a FORMSTACKER. Handling continuous form folds up to 2,000 lines per minute, it actually pulls the paper through the printer, avoids paper congestion caused by static electricity within the printer and fan folds the finished forms into a precisely positioned wire receiver. The FORMSTACKER virtually eliminates paper handling downtime and the need for clerical or secretarial "back up" for high-speed printer operation.

Proved in thousands of installations from coast to coast and overseas. Simple to install, operate, maintain—and pay for.



Readily incorporated in a complete OEM system, or added to existing user systems.

Write or call today for complete details and instant response:

ATI
advanced terminals, inc.
Fort Herkimer Road
RD #2, Box 80
Mohawk, New York 13407
(315) 866-6900

Co-op Reaps Improvement in Grain Accounting

(Continued from SR/27)

As a backup, the local 3790 transmits significant totals and activity to the host on a daily basis. This prevents loss of major record files in the event of a disaster and also provides the host computer with the data needed for input into the general ledger system and the accumulation of marketing volume for each patron.

The host will provide various patron and terminal activity reports to the local 3790 for any time period on request. Obviously, the host computer also uses the accumulated data in monthly grain activity listings and annual patron activity listings.

Management information available on demand from the system is helpful for both control and planning purposes, according to association officials. County co-op personnel can acquire into the 3790s online file records for such patron-related information as current payables balances (including details of latest activity), or for unpriced grain the patron has on hand with the association. Also available on demand are reports showing discount values of unpriced grain for inventory valuation, and contract values for gross margin analysis.

Via Terminal

Similar information is available by terminal and, as mentioned, a position and perpetual inventory report is always available. Audit trail reports of all transactions for the day with detail and totals are available for review, as are monthly grain bank statements with calculations of grain bank charges. As needed, special margin analysis reports or special customer analysis reports can be obtained by the county from the host computer at headquarters.

"Contributions of the new system to our operations cannot be overestimated," according to Joe Latham, general manager of Vico County Farm Bureau Cooperative, one of the first of the IFBCA county members to install a 3790.

Vigo County's current annual grain volume of 6 million bushels is more than double that of a few years ago. It operates a single site, during harvest season, and handles an average of some 200 grain contracts a day.

System Speeds Benefits

(Continued from SR/31)

termine whether or not the aid applicant is known to the system, and if any are currently receiving economic assistance in the local agency originating the application, or in any other agency. This helps eradicate so-called "double dipping" in welfare funds.

Aid Determination

Aid levels are determined by taking into account the combined incomes, assets and offsets of those individuals in the household found to be eligible. The important thing, Wisconsin welfare officials point out, is that the system makes the determinations solely on the basis of each person's situation as represented by the information on the combined application form that is transmitted to the host via the county level 8100 system.

This determination is totally objective to the circumstances. The system always applies current rules, regulations and policies. And it always tests client circumstance and eligibility and benefit criteria separately and independently for each type of aid requested — AFDC, Medical Assistance or Food Stamp.

When the eligibility/benefit determination is made, the host transmits the findings back to the 8100 at the local office. The 8100 prints the determination sheet for use by local administrators and eligibility workers.

That evening, after the CRN goes off-line for the day, the host computer processes the day's activity data base against the case data base to update the case master file records.

"We have seen a dramatic reduction in the time required to determine eligibility and benefits for an aid applicant," Division Administrator Stumbras said. "With the previous system, the delay was often 10 to 15 days after the application was returned to the agency.

"Now, even in the most populous counties, determinations are made usually the same day the application is entered, and, if an application is error-free and valid, a determination can be reported back to the local officials in one-half to three minutes," he asserted.

This swift turnaround applies in the event of reported changes in client situation, and in the mandated-by-Wisconsin-law, which requires a review every six months of every economic assistance case on the books. The new system further assists local officials and eligibility workers by providing six-month review lists of casework activity, enabling the workers to more effectively schedule their time.

Wisconsin was among the first to install the IBM 8100 Information Systems. When the state's CRN was first put into operation, IBM 3790s were installed at the county offices. The switch to the 8100s was made within a few months during the latter part of 1979.

When you see what Braegen can do for your DEC system, one thing leads to another...

Some companies sell just one or two peripherals. So they sometimes end up trying to sell you what they have instead of what you need.

With other companies, peripherals are just a sideline. They would much rather upgrade you to a more expensive mini computer...when maybe a little more memory is all you really need.

That's the important difference with Braegen. We're the only company that specializes in offering a complete line of DEC and Data General peripherals. And once you see the low prices, the speedy delivery and the professional installation you get with Braegen peripherals — you're going to want another, and another and another.

For instance, when one customer recently wanted a disk drive, we were able to provide him both a 80 MByte disk drive and a 300-line per minute printer for about the same price another company wanted to charge just for the disk drive.

That same company also wanted to charge him about $5,000 for a unibus repeater and expansion chassis because his DEC computer was running out of capacity. Instead, we replaced four 16kb memory boards with a Braegen 128kb add-in memory. The result: a dramatic increase in the capability of his computer at a substantial savings.

Braegen peripherals will also lead you to outstanding servicing. Our service contract puts a nationwide network of highly-skilled professionals at your disposal 24-hours a day, 7-days a week. Often our people will be on the scene in just a few short hours.

So if you're looking for peripherals, talk to the company that specializes in them. And see what one little phone call can lead to. Call (714) 632-5245. Or write: BRAEGEN, Minicomputer Peripherals Department, 3340 E. La Palma Ave., Anaheim, CA 92806.

BRAEGEN

and another. And another. And another.

Network Eases Service's Growing Pains

By Max F. Kenyon
Special to CW

MADISON, Wis. — A distributed network of minicomputers tied into an IBM 3031 here is helping one of the nation's largest medical review organizations handle a growing work load.

Wisconsin Physicians Service (WPS) began in 1946 as a division of the State Medical Society of Wisconsin. In 1977, WPS was independently incorporated as a nonprofit organization.

Today WPS has more than 1,200 employees and is a fiscal intermediary for Part B of Medicare in the state of Wisconsin. WPS has administrative and claims processing responsibility for the Civilian Health and Medical Program of the Uniformed Services (Champus) in 10 midwestern states.

Wang VS system at WPS headquarters is one of 26 planned for installation at PSROs throughout the Midwest.

WPS is also a Professional Standards and Review Organization (PSRO) contractor for 17 PSROs throughout the U.S. In addition, WPS operates one of the largest health maintenance organization-type programs in the country.

Operating Principle

Although they perform private reviews for insuring agencies and large corporations, the primary operating principle of the PSRO is to ensure that appropriateness, necessity and quality of care are rendered by physicians in institutions within the geographical area of their authority.

Founded and controlled by physicians but funded through federal grants, PSROs review patient treatments, analyze the treatment patterns of physicians and report their findings of aggregate data to the federal government. These organizations represent a form of physician peer review, primarily designed to help medical institutions operate most efficiently for the benefit of patients.

WPS' services provide the PSRO with the capability of identifying statistical anomalies in medical operations so the PSRO can mandate changes in patterns of practice of physicians and hospitals and, subsequently, measure the impact of the implemented modifications.

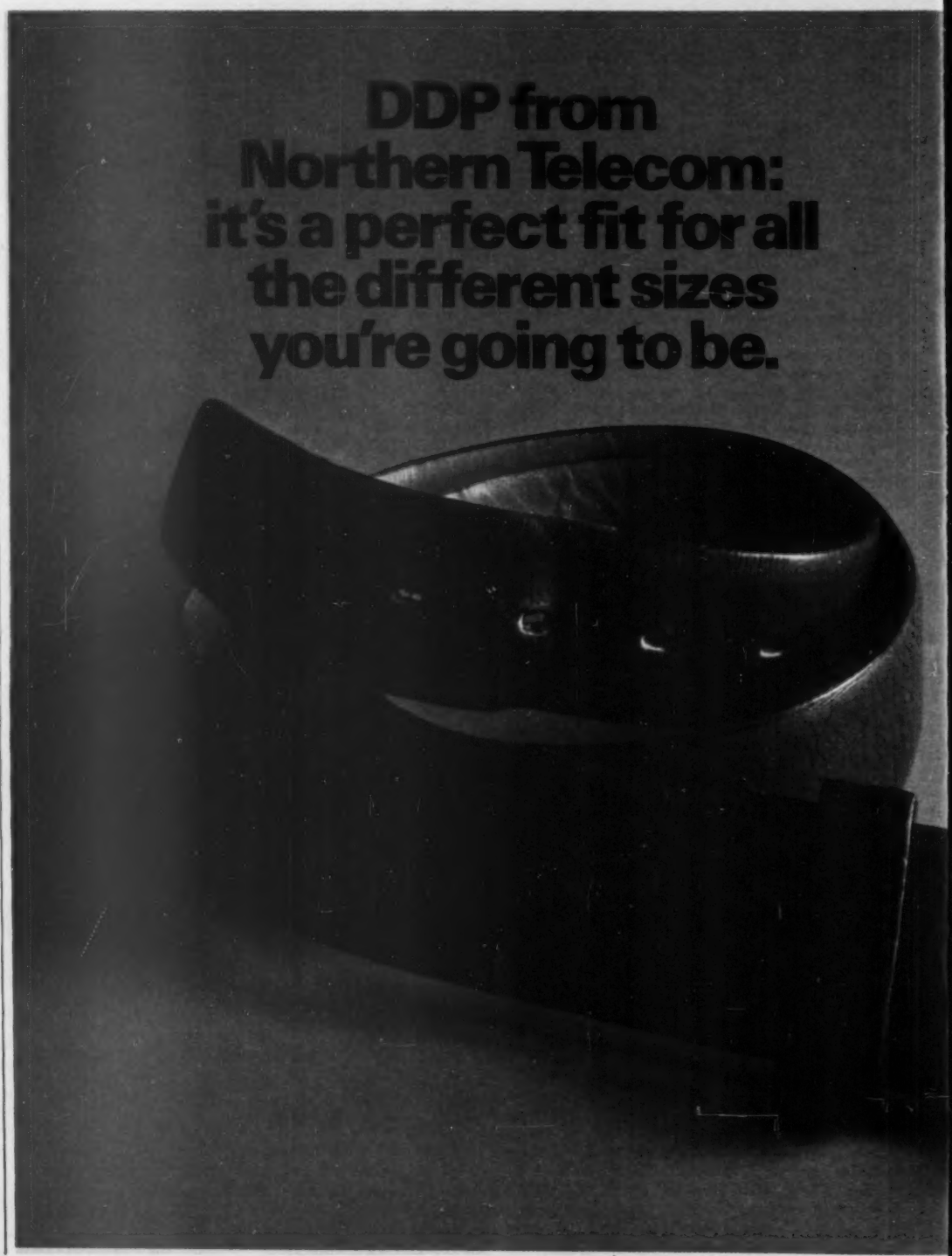
Monitoring volumes of data associated with some 90,000 to 300,000 discharges per year for each PSRO requires substantial DP power. Accuracy and timeliness of data handling is also critical because patient monitoring is performed daily on an ongoing feedback cycle to doctors during patient stays.

Finally, cost-effectiveness, which is seemingly precluded by the first two requirements, is of utmost importance because PSROs are constrained through federal budgets to a limit of $1 per discharge for DP expenses.

WPS originally employed a minicomputer at a remote PSRO site in communication with an IBM 3031 mainframe at WPS headquarters. However, WPS encountered difficulties with the programming language of the satellites — a language which was not Cobol.

In addition, ease of use of reporting capabilities such as browsing and on-demand reporting was lacking: this necessitated a high degree of effort on the part of the WPS staff. It was an intolerable situation which led staff to search for the equipment of another manufacturer.

One might ask why WPS did not opt to install IBM 3277 terminals at each PSRO location. The closest thing IBM offers which has on-demand reporting capabilities is APL. But APL cannot be used on a standard 3277 and requires a



By Augmenting Administrative Tools

special terminal.

Furthermore, APL would also absorb a large percentage of the main core of the WPS 3031; and the data base had to be immediately accessible at any time to a PSRO. The only answer which would not exert too great a demand on the 3031 was distributed processing through remote systems.

WPS surveyed many vendors and finally limited the choice to two — Wang Laboratories, Inc. and another. WPS decided upon Wang hardware for a number of reasons. There was a short deliverable time frame, which staff felt Wang could best satisfy. The Wang system offered excellent report generation and ease-of-use capabilities, which were particularly attractive to nonDP personnel at PSRO locations; Wang also came in with a medium-size minicomputer-priced system — e.g., 128K to 256K memory.

Finally, because one of the languages supported by Wang is Cobol, WPS could easily supplement its present PSRO staff with personnel from its 50-person staff of other Cobol-oriented DP personnel, as might be warranted by future expansion.

VS System

The final choice of WPS was the Wang VS system — in several configurations ranging from 256K memory with tape drive, telecommunications and dual 90M-byte disk drives, downward — depending upon the volume of activity at each site.

A complete VS system is located at WPS headquarters, and six additional systems reside at various PSRO sites. These are configured with from two to four workstations each and one to four printers. Some are also equipped with 1,600 bit/in. magnetic tape drives. In addition, WPS is installing four remote workstations (workstation and printer).

WPS currently has an additional nine VS systems on order and has generated a letter of intent for 10 more systems and remote workstations beyond that. Staff members intend to connect the remote VS and their remote workstations directly into the WPS IBM 3031, with 3270 compatibility. In this way, the mainframe will function as an adjunct, performing large-scale statistical analyses. All programming has been performed by WPS staff.

A year's worth of history on the VS is stored on-line at each location, with multiyear data stored off-line on removable packs or tapes, and is accessible through the master file data stored on the IBM 3031 here. The number of terminals depends upon the amount of data entry performed. Not all data is directly telecommunicated to the VS — some is provided by hospitals and other collectors in magnetic tape format. The data then passes an extensive array of logical edits to ensure validity — for example, an admission date cannot be subsequent to a discharge date.

WPS Goal

The final goal of WPS is not simply to gather data. It is to help the PSRO browse through that data, carrying out comparative analyses in order to determine potential aberrancies in the patterns of practices of hospitals and/or physicians.

Whenever a potential aberrancy is detected — using the Wang-supplied query utility — WPS automatically goes into the report utility and generates associated documentation. The PSRO then presents this to the physician committee that acts upon it — either by requesting supporting documentation or by implementing a remedial plan to correct the aberrancy.

One advantage gained through the report, query and utility capabilities of the systems is the ability to browse data and be able to calculate average length of hospital stays, correlate this with average death rate and then compare average death rate among multiple hospitals to that of one average hospital. This approach enables staff to detect potential aberrancies that may not be evident simply by looking at so-called "normal criteria."

Kenyon is PSRO program director at Wisconsin Physicians Service, Madison, Wis.

Most DDP systems can be expanded somehow. But keeping your system cost-effective as your company grows —that's another story. Northern Telecom Systems Corporation has a collection of ways to ease your growing pains that's hard to match. Take a look—and think about where you're growing.

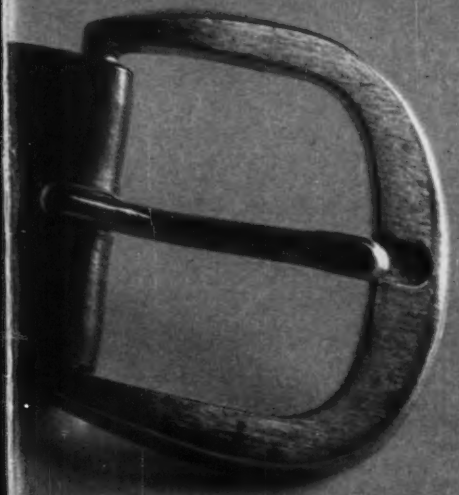
Starting small?

You can start a DDP system at any convenient size if you start with Northern Telecom. We have processors that work efficiently with just a single data station. Or with two. Or eight. Or sixteen. Upward compatibility makes it easy to use some of these processors in tandem.

Extra capability without excess capacity.

Our networking options let you link your processors for more processing power at the data station where it's needed. Easy access to all your processors means you won't have to buy excess capacity for peak loads in isolated places.

Our Multi-Task Operating Systems stretch the capacity of the data station still further. For example, each location can work on inventory, general ledger, receivables and order entry simultaneously. Even disk storage is unusually flexible—from .5 to 308 megabytes. So you never pay for more than you need.



We'll help you add big-time text-editing capabilities while a system is still small. So you can edit both files and programs in a speedy, simple way. Our text-editing ability saves programmer time. And it cuts the need for skilled people—because editing for any remote location can be done from any other location that has a programmer.

We speak your language.

You can start with any of four languages: COBOL, BASIC, RPG and TAL. And add any of the others whenever it becomes appropriate.

But it's not just our DDP systems that soothe your growing pains—it's our whole organization.

Right now, we can deliver state-of-the-art systems for Data Entry, On-Line and Remote Job Entry, as well as DDP. So when you work with Northern Telecom, one call can bring you factory-trained service for every part of your remote processing system.

The best reason to talk to us today is tomorrow.

Northern Telecom is combining data processing expertise with telecommunications expertise — in a mix no other company can match.

Today, it means better access to all the processing power you pay for. Tomorrow, it means a smoother transition to the single system that will meet all your processing and telecommunications needs.

Talk to Northern Telecom Systems Corporation. Where computers and communications meet.

For the office nearest you, call our Marketing Services Department at 1-800-328-6760. In Minnesota call (612) 932-8202. Or write Northern Telecom Systems Corporation, Box 1222, Minneapolis, MN, 55440.

nt northern telecom

Northern Telecom Systems Corporation

Get the lowdown on IT™ August 25.

LEAR SIEGLER, INC. DATA PRODUCTS DIVISION

Photo courtesy of United Artists. IT is a trademark of Lear Siegler Inc./Data Products Division.

For Low-Priority Requests

Approach Lets User Program Own Jobs

By Rita Shoor
CW Staff

WASHINGTON, D.C. – Rather than giving short shrift to end users' low priority requests and one-time reports, an insurance company here lets user departments program the jobs themselves using APL and "personal computing."

About 13 employees at the Government Employees Insurance Co.'s (Geico) Systems Division here are members of a management services unit with what the firm calls personal computing as one of its primary charters.

The organization uses the term "personal computing" even though the work is actually done on terminals tied to a dual processor mainframe complex because "in a community of users, personal computing has a better sound," according to Ronald Blunck, director of the Management Systems Division at Geico.

Personal computing bridges the gap between using a calculator and submitting a formal request to the systems and DP area for a new system. It brings the home computer concept to the office, he said.

"Maximization of productivity" and a significant decrease in the money spent for time-sharing services are two results of this emphasis, according to Blunck.

The company spent approximately $250,000 annually on time-sharing services a few years ago. Present company estimates predict that this should be cut in half by the end of 1980, and the projected annual cost for time-sharing in 1981 could be as low as $10,000.

Geico is one of the relatively few personal and casualty insurance companies that operates as a direct insurance writer – that is, the bulk of the insurance is sold through the mail and over the phone rather than through field agents.

Approximately 90% of the business written is automobile insurance, with the remainder split primarily between fire and homeowners' policies. The company writes between $500 million and $600 million in automobile insurance premiums alone, he said.

Current Configuration

The current hardware configuration includes dual IBM 370/168s with 6M bytes of storage on each mainframe running under OS/MVS.

A recent review of Geico's insurance systems' needs turned up a need for increased availability of data to general managers and analysts in various user departments.

Based upon the findings of this review, it was decided to develop a set of facilities that would allow these users to work directly with data in order to retrieve meaningful information for effective decision making.

While personal computing at Geico involves distributing information retrieval and data manipulation capabilities to users, centralized control is still maintained over both the data and the tools.

Four personal computing facilities are currently available to

(Continued on Page 52)

Covers Leased Equipment

Customized DP Insurance Offered

BOSTON – Commercial Union Assurance Companies has initiated a data processing insurance policy plan that provides coverage for owned or leased equipment; data and media; and extra expenses incurred by business interruptions.

Custom-designed for each business, the policy extends to newly acquired equipment; equipment moved to a new location; duplicate and backup data and media stored at a separate location; the cost of debris removal; and the cost of refilling or recharging fire protection devices, a spokesman said.

The Commercial Union policy also covers mechanical breakdowns, faulty construction, error in design, short circuits, blowouts, or damage caused by processing or work upon the DP equipment, data or media. Coverage is subject to a minimum deductable of $5,000.

Other Coverage

Additional coverage of the policy includes losses resulting from an interruption of a system's power supply, or power surges, black-outs or brown-outs that happen within 100 feet of the insured site.

Flood, earthquake, mysterious disappearance, water seepage and corrosion and rust are also covered, he stated.

Under terms of the policy, the user can choose either actual cash value or replacement cost. The replacement cost provision includes property of others. This provision is reportedly important for an insured user who leases property and is required to carry full replacement cost coverage on leased equipment.

The policy is competitively priced, depending on the user's system configuration and location, the spokesman said. Additional information can be obtained from the firm at One Beacon St., Boston, Mass. 02108.

Four Publications Cover Topics in Micrographics

SILVER SPRING, Md. – The National Micrograpics Association (NMA) has released four publications:

- NMA MS1-1980, "Practice for Operational Practices/Inspection and Quality Control for Alphanumeric Computer Output Microforms" lists for $7 and contains tests and requirements to ensure the quality of alphanumeric computer output microfilm-generated images up to a 48:1 reduction ratio.
- NMA MS23-1979, "Practice for Operational Procedures/Inspection Quality Control of First-Generation Silver-Gelatin Microfilm of Documents" lists for $10 and is an update and combination of two other standards, NMA MS104 and NMA MS110. It details step-by-step establishment of a source-document production operation.
- NMA TR2-1980, "Glossary of Micrographics" costs $9 and is a current listing of more than 1,200 terms used in the micrographic community. It is a revision of the 1971 glossary.
- "Micrographics in Government" is a collection of current articles from the NMA Resource Center and features case histories of many prominent government micrographics applications. It costs $25 in paper and $15 on microfiche.

NMA is located at 8719 Colesville Road, Silver Spring, Md. 20910.

A Simon Legree for Computers

The Beall Channel Switch. Makes computers, peripherals work harder, more effectively. Directs critical on-line services to another CPU when failure occurs. Commands specific peripherals to serve more than one computer. Redrives all CPU signals to give far more flexibility in physical placement of peripherals.

And Beall does all of this less expensively, more reliably and with less opportunity for operator confusion than anyone else.

We make five basic models to provide up to eight switchable interfaces each of which can be logically connected to as many as eight CPUs.

Want to whip up more facts? They're in our new brochure. Write or call for it today.

John Beall & Company, Inc.
9103 Third Avenue • North Bergen, N.J. 07047 U.S.A. • 201-854-3562

Tab System Handles Receiving, Inspection

PALO ALTO, Calif. — Tab Products Co. has introduced a key-to-diskette data collection and retrieval system to produce reports and handle information in receiving and inspection departments.

The Receiving and Inspection System 7080 (Trip) is geared to create reports covering open purchase orders, closed purchase orders, parts awaiting inspection, parts completed inspection and inspector achievement. The system can also generate analysis reports for people involved in the quality assurance field, a spokesman noted.

The receiving and inspection system costs $12,925. Maintenance contracts and lease plans are available from the firm at 1451 California Ave., Palo Alto, Calif. 94304.

High-Speed Recorder Gives Hard Copy From Transients

WALNUT CREEK, Calif. — A high-speed transient recorder that reportedly provides hard-copy output of recurring or single-shot transients is available from Pedersen Instruments.

The Model 57-TR features switch-selectable conversion rates from 50Hz to 200Hz. The 57-TR will also convert analog input data to 10 bit digital words, the vendor said.

In addition, with an oscilloscope, the operator can view analog input signals prior, during or after recording.

The unit costs $3,300 from the vendor at 2772 Camino Diablo, Walnut Creek, Calif. 94596.

Multi-User Capabilities for MicroNOVA™
PCSI Puts Muscle Into Your MicroNOVA™ By Adding Multi-User Capabilities To DG's DOS!
- Supports up to five users simultaneously executing jobs
- All Data General languages for MicroNOVA™ are supported
- User shared code support
- Independent user directories
- Record lockout facility
- Printer spooling package

Now Data General Users Have A Choice!
PCSI
POLYMORPHIC COMPUTER SYSTEMS INC.
P.O. Box 3581 Boulder, Colorado 80307
(303) 422-1182

Disastrous for Some

Distributed Processing Not for All

By Theresa Tanton
Special to CW

ATLANTA — Implementation of a distributed processing system can be beneficial to a company's user and DP areas in terms of improved service and reduced costs. However, this same implementation can be disastrous if the system is not carefully designed and planned.

The objectives of distributed processing are to improve service by keeping edit functions as close to the entry source as possible and to cut costs by reducing communications requirements with the host computer and off-loading some processing functions from the host computer. In attempting to meet these objectives, some specific data characteristics should be considered in order to determine the feasibility of implementing a distributed system.

Applications with complex data structures and a requirement for real-time updates from multiple sources are not well-suited for distributed processing. A good example of this type of application is the typical airline reservation system. The need for real-time updates and accessibility from many different sources requires that the data base be maintained by the host computer. Although data is accessible from many remote locations, the application is maintained by the central processor and all communication is handled by remote terminals through communications lines.

Potential for Success

The application's characteristics will provide some indication of its potential for successful distributed implementation. In order to secure benefits from distribution, the application should be partitionable, simple and well-defined. If communication with the host computer is required, this should be done in batch mode.

In addition, program maintenance should be centrally controlled so that changes at one site can be replicated at all processing locations. Segregated program maintenance will cause problems in processing compatibility between processing sites.

A clear division of processing by function, by data separation or by geographic location is required for an application to be considered partitionable. An on-line data collection application where data is entered and edited in field offices, then transmitted periodically to the host computer for batch processing is a functionally distributed system. Once the host has completed the batch cycle, selected output reports may be sent back to the field office.

Distributed processing applications should be simple and well-defined. Many distributed applications run on smaller computers with reduced CPU power and disk storage capacity. As a result, applications which require complex logic or data structures are not generally suited for distribution since they tend to usurp much of the computer's capacity.

Applications that require few file accesses are good candidates for distribution and those that are highly I/O bound are generally more suited for the CPU.

In summary, the benefits of distribution do not accrue automatically. System characteristics must be carefully considered before choosing distributed processing as the preferred approach.

When distributed processing is indicated, benefits include improved customer service at an overall reduction in cost.

Tanton is a consultant with Dyer, Wells & Associates, Inc. in Atlanta.

Approach Lets Users Program Jobs

(Continued from Page 51)

Geico user department personnel, according to Blunck: APL, Mark IV, Statistical Analysis System (SAS) and specific user request models.

APL is an application language that allows a user to mathematically manipulate data through a terminal.

Primary Users

The primary users of APL are in the actuarial department, where four IBM 3270s are being used for actuarial applications.

Approximately four to six half-day weeks of formal training are required for someone without a programming background to work with APL as a base language, according to Blunck. This period will be reduced considerably if non/programmers are able to use an APL-built package — such as IBM's Financial Planning System (FPS) — for their applications.

The second facility available for high-level business data extraction and manipulation is Mark IV language. Users are able to access files in either batch or on-line interactive mode, and the majority of files created by the Geico large-scale commercial systems are easily defined under Mark IV, he said.

Blunck described Mark IV as a "user-friendly" language. He estimated that someone without previous programming experience could begin to effectively utilize the facility after two to three weeks of training, and that programmers could work with it after only two to three days.

Another personal computing tool — which Blunck said was "not as user-friendly as we'd like," but which is available to perform statistical analysis and to generate both tabular and graphic reports — is the Statistical Analysis System (SAS) from the SAS Institute, Inc. in North Carolina.

And, finally, programmers within the company's systems and DP area have utilized APL, SAS and PL/I to develop models to satisfy specific user requests. After the facility has been developed — models to assist with corporate planning, budget analysis and underwriting audit selection were examples — it is available for access on request from the user departments.

Future Plans

Future company plans include the use of color graphics and a financial planning language as personal computing facilities, Blunck continued.

Two IBM 3279 color graphics terminals and one of the associated 3287 four-color printers are scheduled for delivery in September 1980, with two more terminals and another printer expected by year-end.

An immediate use for this hardware is foreseen in the actuarial department, where it will be used to create color graphs and rate-making displays. Blunck also predicted a

Blunck also predicted a "tremendous increase in productivity" in the company's art department because the artists could use the terminal to modify their displays until the output was completely satisfactory before generating a finished copy.

AMERICA'S LARGEST DATA ENTRY SERVICE
QUALITY DATA AT COMPETITIVE PRICES
OVER 1000 DATA ENTRY OPERATORS
CALL TOLL FREE 800-345-6324
(IN PENNA., CALL 215-825-9080)
Data Entry Services of America
DESA
Two Plymouth Commons, Plymouth Meeting, PA 19462
ATLANTA • DETROIT • KANSAS CITY • LOS ANGELES • MINNEAPOLIS • PHILADELPHIA • SPRING LAKE (NJ)

To Hold Cost Increases to 9%

HP Customizes Service Agreements

By Rita Shoor
CW Staff

CUPERTINO, Calif. — A customized approach to computer support and maintenance has been announced by Hewlett-Packard Co. here aimed at holding down the average increase in the cost of service labor and materials to "about 9%." This figure compares favorably to the 15% increase in these costs caused by inflation, according to HP.

HP's attempt to meet the specific needs of its users has met with the enthusiastic approval of at least one HP customer. The hardware configuration at Longs Drugstore, with its data center headquartered in Walnut Creek, Calif., includes five HP 3000 series mainframes, two HP 2100 minicomputers and about 90 Model 2640 and 2649 terminals from the vendor, Barry Curran, computer operations manager, itemized.

Until "very recently," the drugstore chain used the vendor's Standard Systems Maintenance Agreement to provide service on a same-day, four-hour response basis on all of its HP equipment, he said. "We knew that [HP's] 24-hour coverage seven days a week with four-hour turnaround was really overkill for the terminals."

Modified Contract

HP's newly offered Field Repair Center Maintenance Agreement "custom fits our needs," and Curran estimated that he will save approximately $16,000 per year with this type of service. Six designated HP offices in the U.S. offer this service on a fixed monthly charge basis, according to the vendor, and products which qualify for this service are mailed to the repair center.

The operations manager also noted that he had discussed the possibility of carrying terminals into the HP repair centers if it became necessary to eliminate the mailing time, but indicated that so far, we haven't had to do that."

Curran stressed the flexibility of this type of service and said it worked well with terminal equipment, although he would "question the logic" of anyone sending large peripherals to the service centers.

The Standard Systems Maintenance and Field Repair Center service agreements are the high and low ends of HP's range of agreements, the vendor said.

HP customers are also offered a Basic System Agreement that provides next-day response along with all of the other features of the standard plan. A cost saving of 20% to 25% can be obtained by opting for the next-day-response program, according to a company spokesman.

Finally, an On-Site Product Service agreement provides next-day response and on-sight maintenance services for portable, high-volume products with built-in diagnostic capabilities such as terminals, desktop computers and desktop peripherals — at a savings of about 30% compared with the standard agreement, HP claimed.

A 72-page data book that gives descriptions and specifications of the services is available at no charge from Hewlett-Packard Co. at 1507 Page Mill Road, Palo Alto, Calif. 94304.

DG Offers 'Insider's Guide' To Small Business Computers

WESTBORO, Mass. — Data General Corp. is now offering a pamphlet and audio cassette to help business persons who wish to purchase a small business computer.

"The Insider's Guide to Small Business Computers" contains detailed financial evaluations of typical cost savings in standard business applications and an analysis of how to calculate the real cost of a computer, including the effects of depreciation on tax investment credits, DG claimed.

Individuals chapters of the 70-page book focus on such subjects as how to select computer hardware and software and how much it should cost, the trade-offs between buying application software packages and developing customized applications, how to analyze a computer's cost-effectiveness and how to calculate the time it will take for a computer to pay for itself.

The guide also includes a discussion of the different ways of buying small business computers including the new retail dealer or "computer store."

The "Insider's Guide" comes with an audio cassette tape of interviews with business persons talking about how computers have benefited their companies. The cassette also contains a summary of the contents.

There are approximately two million firms in the U.S. with annual sales between $250,000 and $15 million who may be able to cost-justify a small business computer, according to DG. It is estimated that more than 10% of these businesses will have their own computers by the end of the year.

"The Insider's Guide" and accompanying cassettes are available for $6.95, DG said from General Distribution Division, M.S.S.-223, Westboro, Mass. 01580.

Mini Bits

HP Floppy Disk Drive Line Boosts Memory of HP-85

PALO ALTO, Calif. — Hewlett-Packard Co. has introduced a floppy disk drive family that provides between 270K bytes and 1.08M bytes of memory to its HP-85 system.

The HP 82900 series drives read double-sided, double density, 5.25-in. disks and simplify on-line data storage operations found in scientific, engineering and business data base program applications, the vendor claimed.

The interface between the HP 85 and the disk drives is the HP-85 Mass Storage read-only memory (ROM), which makes available a set of instructions that increases mass storage capabilities, a spokesman said.

Included are 30 additional Basic commands that allow the user to take advantage of those capabilities without learning a new language.

Several models are available, ranging from the HP 82901M dual master drive at $2,500 to the $1,300 HP 8290S single add-on drive. HP is located at 1501 Page Mill Road, Palo Alto, Calif. 94304.

Digital Graphics Plotter Uses Four-Phase Stepping

MOUNTAIN VIEW, Calif. — A digital graphics plotter utilizing four-phase stepping motors to provide drum rotation and linear pen motion is being offered to microcomputer users by Strobe, Inc.

The Model 100's small step size helps achieve high-quality hard-copy output, according to the firm. The drum was designed to accept 8.5-in. by 11-in. paper, and the pen holder can accommodate a variety of commercially available pens. The Model 100 also features an interactive digitizing mode of operation for entering X-Y coordinate data corresponding to pen location directly to the computer.

The Model 100 costs $680 from Strobe at 897-5A Independence Ave., Mountain View, Calif. 94043.

Westinghouse W2500 Users Get Memory Storage System

EL SEGUNDO, Calif. — Imperial Technology Inc. has adapted its Maxiram-25 memory storage system for Westinghouse Electric Corp. W2500 CPUs.

The product is a solid-state, nonrotating, random-access memory system that attaches to the I/O bus and can replace most fixed-head disk drives.

The unit is packaged in a 19-in. rack-mountable chassis and comes with its own controller in a standard I/O card position. The unit can accommodate between 512K and 4,096K bytes of memory, which is expandable in 512K-byte increments.

Maxiram-25 costs from $13,750, the vendor said from 831 S. Douglas St., El Segundo, Calif. 90245.

Logical Analyzers Linked To HP, DG Minis

PALO ALTO, Calif. — Hewlett-Packard Co. has released three minicomputer interfaces to connect logical analyzers to HP and Data General Corp. systems.

The interfaces are Model 10279A Nova 3, Model 10280A Micronova (both for DG systems) and Model 10285A for HP 1000 L-Series systems.

The interfaces attach directly to minicomputer buses and control lines. All interfaces can be used with the Model 10277A/B/C/D General Purpose Probe Interface. Logic analyzer probe pods plug into the 10277, and ribbon cables connect to the minicomputer interfaces, the vendor said.

The HP interfaces are said to make the real-time analytical measurement of analyzers available to users without the extra time and skill often needed to connect leads individually. The flexibility in selecting input signals allows for more efficient use of the logic analyzer in design, integration and preventative and corrective maintenance, the vendor claimed.

The 10279A and 10280A cost $500 each, and the 10285A costs $350. HP is located at 1507 Page Mill Road, Palo Alto, Calif. 94304.

TI's TM990 Series Micros Get Isolated I/O Board

BENTON HARBOR, Mich. — Digital Interface Systems, Inc. has announced the Model 990-130 isolated input/output board compatible with the TM990 series microcomputer from Texas Instruments, Inc.

Bus-compatible with the TM990, the I/O board is available for $450.

Digital Interface Systems can be reached at P.O. Box 1446, Benton Harbor, Mich. 49022.

Data Entry System Based on DG Micro

MEMPHIS, Tenn. — The Minicomputer Division of Data Communications Corp. has introduced a data entry system that utilizes the Data General Corp. MP100 microprocessor. The Unique Micro/Data Collection System was designed to operate in small installations that require comprehensive data entry capability, the vendor said.

The system features data security to provide file access control by operator name and data base name; real-time editing; validation and table look-ups to eliminate postentry edit runs; and user-selectable data verification methods to allow sight or key verify operations.

Along with user functions, the system also supports supervisor-oriented functions such as data base maintenance and system-generated production statistics reports.

The system costs approximately $17,000, and the basic configuration includes a display/keyboard keystation, the MP100 microprocessor with 64K bytes of MOS memory, a dual floppy diskette drive and a 60 char./sec printer. The price includes software, documentation and training.

The firm is headquartered at 3000 Directors Row, Memphis, Tenn. 38131.

For Industrial Sites

TI Adds Data Acquisition Gear

HOUSTON — A line of industrial remote data acquisiton and control equipment to complement Texas Instruments, Inc.'s 990 minicomputer family has debuted.

At the same time the IS990 Remote I/O line was introduced, TI also announced Industrial High-Level Data Link Control HDLC, a communications package that allows differential line industrial networking of TI's DS990 computer systems, IS990 remote I/O systems, PM550 programmable controllers and TM990 microcomputer modules.

The IS990 is a small form-factor microcomputer that allows the distribution of computing power to the site of each industrial application, according to the firm.

Using a DS990 system (models 4, 6, 8, 20 or 30) as a primary system, the user reportedly can configure multidropped networks of up to 32 secondary systems on shielded, twisted-pair wire at distances of up to 9,800 ft.

Secondary systems can be any combination of the following TI systems: DS990 Model 2, 990/5 microcomputer systems using either TX990 or TX5 operating systems, IS990 remote I/O systems, PM550 programmable controllers and TM990 microcomputer modules.

The heart of the IS990 system is a processor module containing 8K bytes of erasable programmable read-only memory (Eprom) and up to 8K bytes of random-access memory (RAM). The Eprom is preprogrammed to provide communications, remote downloading, debug aids and self-testing.

An IS990 four-slot chassis, power supply, processor, three I/O modules, termination panels and cables start at $3,775. The Industrial HDLC communications package software license is priced from $1,300 to $2,500.

Further information is available from TI's Digital Systems Group, P.O. Box 1444, M/S 7784, Houston, Texas 77001.

DEC PDP-11s
ARE OUR BUSINESS

CASH
FOR YOUR
11/34-VAX-11/70

- SYSTEMS
- PERIPHERALS
- SURPLUS INVENTORY

Please Call: (800) 423-5321, Ext. 20 or 13
In California: (213) 889-6031, Ext. 20 or 13

TYMSHARE
Equipment Support Division
31355 West Agoura Rd
Westlake Village CA 91361

System Aids Job Shop Control

ANN ARBOR, Mich. — A minicomputer-based job shop management system that reportedly gives quick and accurate job estimating, job costing and general accounting reports has been announced by Manufacturing Data Systems, Inc. (MDSI).

Comshop V, a minicomputer-based business applications software package, was designed specifically to meet the critical needs of small, independent manufacturing shops for detailed financial reports.

According to its vendor, Comshop V is actually two systems in one — a job costing and estimating system, plus a general accounting system. The heart of both systems is a custom-designed general ledger, which gives the package its ability to track both direct and indirect expenses.

Purchase price of a typically configured Comshop V system is $73,000, including a perpetual license to use the MDSI customized software package; training classes; and on-site support for 120-days.

Also included in the price are a 64K-byte minicomputer with 20M bytes of fixed disk storage, a 300 line/min printer, two CRT terminals, a modem to allow remote access by either the customer or MDSI support engineers, and one year of hardware maintenance.

Currently available in Michigan and Illinois, with other areas following "in the near future," the Comshop V system will be demonstrated at the International Machine Tool Show in Chicago, Sept. 3-12.

MDSI is located at 4251 Plymouth Road, P.O. Box 986, Ann Arbor, Mich. 48106.

Information Automation Unveils Factory Turnkey

WHITE PLAINS, N.Y. — A factory data collection and shop floor control system based on a Digital Equipment Corp. minicomputer is available from Information Automation, Inc.

The Datacom system provides continuous automatic monitoring and analysis of production operations and was designed to increase productivity in manufacturing plants by 15% or more, the vendor claimed. The complete turnkey system includes either a PDP-11/04 or PDP-11/34.

Provision is included to interface the system with a plant's central mainframe for inventory, scheduling, requirements planning and incentive pay processing, a spokesman said.

The system costs between $150,000 and $1.5 million from Information Automation at 925 Westchester Ave., White Plains, N.Y. 10604.

Medical Records System Offered by Promedics

PALO ALTO, Calif. — Promedics Data Corp., a systems house specializing in health care and word processing, will market Mass-11, a word processing and data base management system developed by Micro Systems Engineering Corp. of Hoffman Estate, Ill.

With the addition of Mass-11 to its product line, Promedics will offer a medical records system that can store, merge, sort and retrieve medical records and generate reports, letters or documents.

The system features list processing, mathematical functions and user-generated input and output templates. It will be implemented on Digital Equipment Corp. PDP-11 systems using RT-11, RSX-11M or RSTS/E operating systems.

The firm also plans to sell the software as part of complete turnkey systems.

The software itself costs $3,000 for use with the RT-11 operating system and $4,000 for use with RSX-11M or RSTS/E. The turnkey systems will range in price from $26,000 to $30,000, depending on the number of terminals desired, a spokesman said from Suite 240, 1032 Elwell Court, Palo Alto, Calif. 94303.

Micro Printer Offered for $335

ATLANTA — I-Mark is now marketing the Eaton Printer Products' 7000+ dot matrix impact printer on a direct-mail basis for $335. The 7000+ interfaces with Radio Shack TRS-80s, Apple Computer, Inc. Apples, Commodore Business Machines, Inc. Pets and most other micros.

I-Mark can be reached at P.O. Box 11852, Atlanta, Ga. 30355.

AC Controller Has Eight Outlets

SANTA ANA, Calif. — Marway Products, Inc. has introduced a compact ac power controller with eight outlets, EMI filter and built-in circuit breaker for microcomputers.

The MPD 117 costs $89. OEM discounts are available.

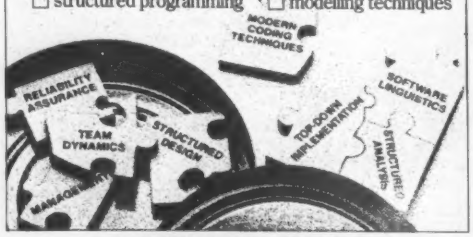
Marway Products is at 2421 S. Birch St., Santa Ana, Calif. 92707.

SOFTWARE SIMPLIFIED

LEARN TO FIT THE PIECES TOGETHER

SOFTWARE ENGINEERING LECTURES
Developed and presented by
ED YOURDON AND TOM DeMARCO

☐ management implications ☐ future trends
☐ structured analysis ☐ structured design
☐ structured programming ☐ modelling techniques



YOURDON
Yourdon inc., 1133 Avenue of the Americas, NY, NY 10036
(212) 730-2670 or toll free (800) 223-2452

A Paradox?

High-Tech Stocks Luring Investors

By Marcia Blumenthal
CW Staff

NEW YORK — Despite the decline in second-quarter earnings reported by some computer mainframers, the prices of high-technology stocks have rallied in recent weeks.

A paradox? No. Investors are looking to the long term and are realizing that most computer companies can register gains in earnings during 1980 and 1981, according to William D. Estabrook of Kidder, Peabody & Co. Agreeing with Estabrook was John J. McManus, a computer analyst with Shearson Hayden Stone, Inc. He noted that June order figures in the industry improved markedly over May levels.

This order growth, which in part is causing the spark in the market, is attributable in some degree to users' improved ability to gauge the economy and their willingness to lease machinery now in light of declining interest rates. This is true even for small business system users, McManus said, pointing to activity in the stock of Cado Systems Corp.

Two or three months ago, computer industry stocks were undervalued, observed Jay P. Stevens, an analyst with Bear Stearns & Co., who noted that the market is playing catch-up.

Another fresh source of capital for computer stocks is institutional investors. This group is "viewing high-technology stocks as equally important as petroleum companies because computers and electronics will be as vital to the country in the next decade as oil has been," Steven T. McClellan, a vice-president of Salomon Brothers, observed. Many big investors are ignoring poor short-term earnings results in favor of long-term growth, he noted.

Illustrating the spurt in stock market activity between July 3 and July 17, IBM's stock rose from $60.63 to $64.50, and Control Data Corp.'s stock jumped from $55.25 to $62.75. Likewise during the same period, NCR Corp. posted a gain from $59.63 to $68.53; Honeywell, Inc., from $80.63 to $88.75; Digital Equipment Corp., from $69.25 to $76.75; Data General Corp., from $67.50 to $74.50; and Prime Computer, Inc., from $22.75 to $28.

Evaluating industry prospects for the 1980s from the performance of 13 selected computer companies including the six major mainframers, Amdahl Corp., Automatic Data Processing, Inc., Centronics Data Computer Corp., Datapoint Corp., Dataproducts Corp., Digital Equipment Corp. and Storage Technology Corp., Kidder, Peabody noted that the stock prices of this group increased 11% since April.

While orders for this group averaged 18% in the first quarter

(Continued on Page 58)

Mainframers Issue Second-Quarter Earnings

Control Data Corp.'s earnings from computer operations remained flat for the second quarter, while consolidated earnings at Honeywell, Inc. declined 7%. Sperry Corp.'s consolidated earnings for its first quarter of fiscal 1981 rose 16.6%.

The Minneapolis mainframer reported earnings from its computer business of $23.8 million, compared with the $23.7 million earned in the same quarter a year ago.

Consolidated earnings were $39 million or $2.25 per share, compared with earnings of $37.6 million or $2.18 per share for the like period a year ago.

Revenues from the computer business reached $688 million, up 28% from last year's second-quarter revenues of $536 million. Total corporate revenues were $943 million for the period up from $771 million last year.

(Continued on Page 58)

For 'Syncsort' Program Products

Whitlow Sort Processes Patented

By Marcy Rosenberg
CW Staff

ENGLEWOOD CLIFFS, N.J. — Whitlow Computer Systems, Inc. has obtained a patent on the sorting processes used in its Syncsort sort program products, an effort that took eight years and cost about $100,000.

While not the first patent granted for a process implemented in software, the Syncsort patent (No. 4,210,961) was the first granted for "a sort-related process that is actively marketed for commercial applications," company president Aso Tavitian claimed.

The patent covers 35 specific processes which contribute to two main inventions. The first is said to allow "the immediate reuse of disk space after data previously written there has been read into memory." The second invention "eliminates rotational delay and arm movement time associated with most 'write' operations in the merge process by combining read/write operations during the merge process into a single operation," Whitlow explained.

Commenting, in a prepared statement on the significance of the patent, Tavitian said, "This would appear to be the first time the legal protections of the patent laws have been extended to processes implemented in such a critical software program product" — critical because "sorting is the most frequent job on any business computer."

He added that Whitlow "intendes to make sure that any existing or future infringements on the patent are protected against." Asked what he meant by "existing infringements," Tavatian declined comment.

He was more talkative when queried as to why it took so long to obtain the patent. Tavitian attributed part of the delay to the

(Continued on Page 56)

NCR to Pump Up Chip Production

DAYTON, Ohio — NCR Corp. will increase from 40% to 60% the amount of its internally manufactured custom-designed semiconductor components by 1984.

The company intends to spend approximately $155 million during the next four years to double its capacity for designing and producing chips for its terminal and computer systems, NCR Chairman William S. Anderson said.

The company will continue to purchase high-volume "standard" microcircuits form outside sources in increasing quantities, Anderson said. However, "innovations in computer and terminal architecture will require very high-performance custom circuits in future years, and standard circuits are not the complete answer to the systems requirements we foresee for the 1980s," he added.

Last September the firm revealed it had chip manufacturing problems [CW, Sept. 3]. Although the company would not reveal which circuits were impacted by the yield problems, the impasse depressed the firm's third-quarter earnings.

NCR established its first in-house semiconductor capability 10 years ago. The new investment will give the firm the capa-

(Continued on Page 56)

WHY ORDER A SMALL SYSTEM YOU HAVE TO WAIT FOR?

CALL DDI–IT BEATS WAITING 2 WAYS!

Datapoint 1500

1. You get off-shelf delivery of Datapoint 1500, Datapoint 1800 or Durango F-85...each offering unique features and top ratings in price/performance.

DDI also makes available nationwide maintenance...professional support from nearby branch offices ...a wide choice of peripherals and quantity discounts that build with each additional product you buy.

2. DDI's powerful, portable MicroCobol™ software frees you from dependence on manufacturers ...enables you to switch to any of many small systems without reprogramming.

MicroCobol is the only program development tool you need. It gives you complete capability in data entry, communications and business applications.

For action, contact John Carman, National Sales Mgr.—Systems, 50 Washington St., Norwalk, CT 06854. Tel: (203) 853-2290.

Data Dimensions, Inc.

Ramo to Keynote Wescon/80

ANAHEIM, Calif. — Dr. Simon Ramo, a noted technologist and a founder of TRW, Inc., will be the keynote speaker when Wescon/80 is staged here Sept. 16-18. About 50,000 electronics professionals are expected to attend the three-day event, show organizers said.

Ramo will speak on Sept. 15 at the keynote luncheon, a preview event. A scientist, engineer, business executive and educator, he was a pioneer in microwaves and developed General Electric Co.'s electronic microscope. Later, he was the director of guided missile programs for air defense and chief scientist for the nation's Intercontinental Ballistic Missile program.

His government service also includes the chairmanship of the President's Committee on Science and Technology and membership on a number of advisory bodies, including the White House Office of Science and Technology Policy.

His business experience includes executive positions with Hughes Aircraft Co., TRW and its predecessor companies and Bunker-Ramo Corp. He retired in 1978 as vice-chairman of TRW's board of directors and chairman of the company's Executive Committee.

A founding member of the National Academy of Engineering and a member of the National Academy of Sciences, Ramo is a recipient of the National Medal of Science, America's highest science honor.

Whitlow Gains Sort Patent

(Continued from Page 55)

Patent Office, which was awaiting the outcome of several software patent cases before the Supreme Court in 1974 and 1975 before acting on Whitlow's application.

Another factor was the need for revisions and qualifications of the required written description of the invention which, in this case, was very technical. "A small company like ours didn't have a staff of specialized technical writers that could easily translate highly technical descriptions into laymen's terms," he remarked.

In light of the various opinions voiced in recent years as to how best to protect software, what prompted Whitlow to go the patent route instead of pursuing trade secret or copyright protection? "Patent laws by definition gave you essentially a legal monopoly," Tavitian said, referring to the fact that patents are issued to the proven first inventor of a unique and unobvious process. "I don't think trade secret protection allows for the timing of the invention."

Another advantage he cited was that under patent law, "you have the option of whether or not to grant a license to use the patented invention."

But perhaps the most important benefit patent protection will offer Whitlow is the freedom to talk about how Syncsort works, something Tavitian feels is an important marketing tool.

Before obtaining the patent, the firm protected the software by never delivering source code to customers and by being "tight-lipped" about its technical details.

The deal of 1980!

Computer SystemCenter

CP/M SOFTWARE: ACCOUNTS RECEIVABLE
ACCOUNTS PAYABLE
GENERAL LEDGER
PAYROLL

ONE TIME OFFER: For $500.00, TCS Corporation's Microsoft Basic, CP/M compatible software sounds like a bargain. But, wait until you hear about it's many disadvantages!

A LITTLE HISTORY:

For the past four years, TCS Corporation has been selling Portec (MITS) business systems as one of their largest and oldest dealers. Since we were so early in the microcomputer marketplace, we were forced to develop an extensive array of business software. Some of this software has been marketed for years by Portec.

During 1978, a set of four business systems was developed for sale in the CP/M environment under the name "Peachtree Software". However, during this period there was a split among the principals which resulted in a parting of the ways — TCS Corporation and Retail Sciences (RSI).

It was decided that RSI would retain the "Peachtree Software" trademark and for a period of one year, TCS would be restricted from competing with them. So, for the past year, RSI has been enhancing and marketing their version, and now TCS is ready to market our version to you.

EXACTLY WHAT IS IT?

A fully integrated business software arsenal including:

General Ledger - provides immediate financial information for your company by keeping thorough record of all financial transactions.
Accounts Receivable - instant customer account information (current and aged) with complete invoicing and statement capabilities.
Accounts Payable - maintains complete vendor/voucher history including check writing capabilities.
Payroll - calculates payroll for every type employee while maintaining monthly, quarterly and yearly totals for reporting purposes in multiple states. User modifiable tax tables. W-2, 941's, etc.

TALK OF VALUE!

This offer is absolutely the best software value we have ever heard of. For only a one-time charge of $500.00 you will receive all four systems to use at your discretion. They will form a solid base for your marketing efforts as they are or with your enhancements.

TCS CORPORATION
P.O. Box 47586, Atlanta, Georgia 30362 / 404-455-6162

SYSTEM REQUIREMENTS
- 8080 or Z80 CPU
- 48K RAM
- Microsoft Basic, CP/M

SUCH AS
- Mod II
- Tandy II
- Cromemco
- Dynabyte
- Altos
- Apple
- North Star
- Heath
- Super Brain
- Ohio Scientific
- PCC 2000
etc., etc. . .

OFFER INCLUDES
- all four systems
- source code
- sample data
- comprehensive users manuals

Ask for Lynn . . . she will be waiting to hear from you.

If you haven't received this letter, call us . . . 404-455-6162

NCR to Boost Chip Production

(Continued from Page 55)

bility to respond more quickly to a changing market environment and to protect its supply of components in times of shortages, Anderson said.

Planned Expansions

Slated for expansion are the company's microelectronics facilities in Miamisburg, Ohio, Fort Collins, Colo., plus a new facility in Colorado Springs, Colo., which will supplement the existing facility in that city.

By 1985, employment at those four facilities will reach about 1,940 persons, more than double the 930 employees working at the three plants operating today.

At Miamisburg, NCR will spend $50 million during the next four years on a 87,000-square-foot expansion. Construction will begin this summer. This will be the fourth expansion of the facility, which specializes in nonvolatile memories and custom logic devices.

The Fort Collins facility will also receive a $50 million investment over the next four years. The facility will be NCR's source of low-power CMOS components.

A $55 million investment is scheduled for the two facilities in Colorado Springs, the newest of which will product very large-scale integrated circuits.

Correction

Former U.S. Secretary of State Cyrus R. Vance has been elected to IBM's board of directors, not trustees [CW, July 14].

RSX-11M
ON-SITE COURSES

- MACRO-11 USER
- FORTRAN USER
- SYSTEMS (internals)

Call toll-free for detailed course outlines.

Mini & Micro Educ. Services
(800) 327-9009 ext 265

Raise Procurement Cost Ceiling

GSA Proposals Stress Software Conversions

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Increased emphasis on well-planned software conversions highlights amendments proposed recently to federal DP systems management and procurement regulations.

Now out for comment, the regulations proposed by the General Services Administration (GSA) would raise to $500,000 the procurement cost ceiling under which federal agencies can administer their own competitive procurements without prior GSA approval. The current ceiling is $300,000.

Developed by GSA's Automated Data and Telecommunications Service (ADTS), the proposals pull together existing temporary regulations, changes that have been under consideration for some time and the results of recent ADTS deliberations on software conversion costs in federal DP, according to GSA.

"We faced up to the problem of conversion costs," said Robert Coyer, assistant ADTS commissioner for policy and planning, in describing the detailed guidelines for planning and implementing software conversions.

Under the proposals, which set guidelines for estimating and methods for controlling conversion costs, all federal DP acquisition planning will include a software conversion study.

In addition, preconversion planning is emphasized, with federal DP manager, instructed to, among other things, purge nonessential programs before conversion, identify numbers of lines and files to be converted, and document "specific agency actions taken to reduce the risk and cost of conversion."

The comment period for the proposed regulations ends later this month.

Answer to Criticisms

The recent proposals answer in many respects criticisms leveled at federal DP acquisitions and management. Recent reports by Congress' General Accounting Office, for example, have charged federal agencies with lack of preprocurement planning, failure to take advantage of modern software development tools and consistently bungling software conversions.

ADTS is hoping the hundred or so pages of proposed regulations, along with the recently established federal conversion support center and an ADTS reorganization, will help bring federal DP more in line with up-to-date practices found in private industry.

Among the proposals are regulations that would require:

- Annual agency DP plans, to include estimates of additional DP support to meet mission needs, approximate acquisition schedules, staffing and funding requirements and proposals for taking advantage of new technology, software improvements and "changes in the marketplace."
- A "comprehensive requirements analysis" to support systems acquisitions. Acquisitions must be based on clearly identified agency needs, deficiencies in existing capabilities, changes in agency program requirements or "opportunities for increased economy and efficiency."
- Decisions on purchase or various lease options based on evaluation of life-cycle costs of procurement alternatives.
- A comparative costs analysis of alternatives for meeting agency program objectives. This would include analysis of the relative merits of sharing DP facilities with other federal agencies, using commercial DP services, upgrading present systems, revising job streams to improve throughout capability, and others.
- Throughout, the regulations proposed by ADTS emphasize that federal DP managers should rely on federal or American National Standards Institute standard software languages "to the maximum practicable extent."

Concerning the ceiling for "blanket delegations of procurement authority," the regulations would allow agencies to procure DP equipment costing up to $500,000 (or $12,500/mo) on a competitive contract and $50,000 (or $1,500/mo) on sole source contracts.

For commercial software acquisitions, the ceilings would be $100,000 for competitive procurements and $50,000 for sole source contracts. Provisions for purchasing maintenance services are also included.

Exporters Get Guide To Japanese Market

NEW YORK — Things that prospective exporters to Japan should know and expect are explained in a free booklet, "The Japanese Market: American Exporters Speak," available from the Japan Trade Center here.

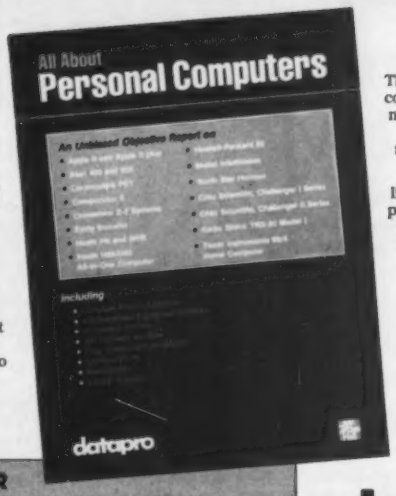
Based on a survey of new and established American exporters, the 20-page publication features the actual experiences of members of a U.S. Commerce Department-sponsored export promotion mission to Japan.

Copies may be obtained from the Japan Trade Center, Public Affairs Department, 1221 Ave. of the Americas, New York, N.Y. 10020.

New!

The industry's first unbiased, objective report on the 15 most popular

Personal Computers



Datapro's latest report provides valuable information that will help you compare and evaluate 15 of the most popular computers. Over 60 fact-filled pages on pricing, applications, characteristics, specifications, options, retail availability, discounts and more.

All About Personal Computers also contains extensive directories on nearly 500 software vendors, over 400 peripheral equipment vendors, 47 system vendors, and 19 periodicals dedicated to users of personal computers.

The report also defines personal computers; tracks their development; details their use; outlines their current and projected markets, and even takes a look at future trends.

If you are considering buying a personal computer — for home, entertainment or work — you owe it to yourself to save time and money by comparing the 15 most popular. *All About Personal Computers* lets you do it quickly and easily ... and it's only $25

15 MOST POPULAR PERSONAL COMPUTERS

- Apple II & Apple II Plus
- Atari 400 & 800
- Commodore PET
- Compucolor II
- Cromemco Z-2 Systems
- Eddy Sorcerer
- Heath H8 & WH8
- Heath All-in-One Computer
- Hewlett-Packard 85
- Mattel Intellivision
- North Star Horizon
- Ohio Scientific Challenger Series I & II
- Radio Shack TRS-80 Model I
- Texas Instruments 99/4 Home Computer

datapro

DATAPRO RESEARCH CORPORATION
1805 Underwood Blvd.
Delran, NJ 08075
(800) 257-9405

Please send Datapro's $25 report
ALL ABOUT PERSONAL COMPUTERS

☐ Check enclosed
☐ Bill me, add $2.50 handling

I want to save $2.50 handling, so charge my

☐ MASTER CHARGE
☐ VISA

Name _____ Title _____
Company _____ Phone _____
Address _____
City _____ State _____ Zip _____
Card No. _____ Exp. Date _____
Signature _____

datapro DATAPRO RESEARCH CORPORATION • 1805 Underwood Blvd. • Delran, NJ 08075 CW728

Magnuson Revenues Rally

SAN JOSE, Calif. — Magnuson Computer Systems, Inc., which went public on June 25, reported second-quarter revenues of $6.8 million, up from $1.3 million in the same quarter a year ago.

Earnings for the second quarter totaled $784,000 or 21 cents per share. Earnings reflected a $360,000 tax loss carryforward. This compares with a $1.1 million loss incurred in the same quarter of fiscal 1979.

For the first half, the IBM plug-compatible mainframer earned $1.5 million or 41 cents per share, including a tax loss carryforward of $700,000. In the like quarter last year, the firm lost $2.4 million.

Revenues for the first six months totaled $12.5 million, up from $1.6 million in the first half of 1979.

Magnuson's stock traded on the Over-The-Counter market was initially offered at $20 and at press time on July 18 closed at $26.25.

"Let your customers key their own orders".

Richard Newberry, V.P. Marketing, Phone 1, Inc.

The P1-5 Data Concentrator permits your customers to remotely key their own orders for your products. It will simultaneously answer up to eight calls and provide immediate storage on computer diskettes. Your customers may key their orders on a hand held terminal or simply use their push button dial telephone. Call or write for complete information.

PHONE 1 • P.O. Box 1522 • Rockford, Illinois 61110 • 815/877-9008

OEM America Meets

At The Invitational Computer Conferences

In Boston...in Ft. Lauderdale...in Palo Alto and seven other cities. OEM decision-makers meet the country's top computer and peripheral manufacturers at the Invitational Computer Conferences—the only seminar/displays designed specifically for the unique requirements of the quantity user.

In one day, at each 1980/81 ICC, guests will receive a concentrated, up-close view of the newest equipment and technology shaping our industry. Some of the companies which participated in the 1979/80 ICC Series were: ADDS; AVIV Corp; Applied Data Communications; BASF Systems; Cambridge Memories, Inc.; Centronics; Century Data Systems; Cipher Data Products; Compugraphic; Computer Devices; Control Data Corp.; Data Systems Design; Dataproducts Corp.; Dataram; Datasystems Corp.; Diablo Systems; Documation; Emulex Corp.; Facit Data Products; Florida Data; Hewlett-Packard; International Memories, Inc.; Kennedy Company; Lear Siegler; MDB Systems; MFE Corp.; Microdata; Monolithic Systems; Mostek; NEC Information Systems; National Semiconductor; Olivetti; Perkin-Elmer Memory Products; PerSci, Inc.; PCC/Pertec; Pioneer Magnetics; Plessey Peripherals; Powertec; Priam; Printronix; Remex; Rianda Electronics; Scientific Micro Systems; Shugart Associates; Siemens; Storage Technology; TEC; Tally Corp.; Teletype; Telex Computer Products; Texas Instruments; Trilog; Universal Data Systems; Versatec; Xylogics.

The schedule for the 1980/81 Series is:

Sept. 8, 1980	Newton, MA
Sept. 30, 1980	Valley Forge, PA
Oct. 22, 1980	St. Louis, MO
Nov. 18, 1980	Palo Alto, CA
Jan. 13, 1981	Orange County, CA
Feb. 3, 1981	Ft. Lauderdale, FL
Feb. 5, 1981	Atlanta, GA
Mar. 3, 1981	Dallas, TX
Mar. 5, 1981	Houston, TX
Apr. 2, 1981	Denver, CO

Invitational Computer Conferences

Invitations are available from participating companies or the ICC Sponsor.
For further information contact:
B.J. Johnson & Associates, Inc.
2503 Eastbluff Drive, No. 203
Newport Beach, CA 92660
(714) 644-6037

Mainframers Issue Earnings

(Continued from Page 55)

Six-month revenues for the computer business were $1.3 billion, up from just over $1 billion for the first six months of last year. Combined revenues for the first half were $1.8 billion, up 28% from revenues of $1.5 in the same period a year ago.

Earnings from the computer business to date were $44.3 million, up 12% from the $35.5 million in the first half last year. Corporate earnings for the first six months were $74.2 million or $4.28 per share, up from $62.6 million or $3.63 per share a year ago.

Commenting on the results, Executive Vice-President of Finance Marvin G. Rogers said the modest earnings again in the second quarter reflected the fact that earnings in the comparable period last year were at a record high. He also noted that the company's computer operations this quarter reflected increased expenditures related to new products and services.

At Honeywell, earnings before extraordinary items for the second quarter were $56.9 million or $2.53 per share, down 7% from earnings of $61.3 million or $2.65 per share in the like period a year ago. Earnings for the first six months totaled $103.7 million or $4.61 per share, down from the $120.9 million or $5.32 per share earned in 1979.

Revenues for the quarter increased to $1.2 billion, up from $990.7 million a year ago. For the first six months revenues totaled $2.3 billion, compared with $1.96 billion for the first half of 1979.

"The second quarter results were somewhat better than we had anticipated earlier. The results of our European computer associate CII-Honeywell-Bull, which were a principal reason for our lower first quarter earnings, improved sharply in the second quarter," according to Ed Spencer, chairman and chief executive officer.

For its first quarter, Univac reported revenues were up 14%, and orders and backlog were both up 10%.

Total revenues for Sperry were $1.27 billion, up 16.8% from revenues of $1.1 billion in the first quarter of fiscal 1980.

Earnings were $63 million or $1.54 per share, up from $54.2 million or $1.38 per share in the same period a year ago.

High-Tech Stock Luring Investors

(Continued from Page 55)

and are estimated at 19% for the recently completed second quarter, Estabrook expects the average order rate gain for these companies will moderate to the 10% level during the rest of the year. This would result in an order rate growth prediction of about 14% for the year, down from 1979's order rate growth of 21%.

As for earnings growth for the quarter, the group is expected to average 9%. This excludes Amdahl Corp., which is projected to have a 257% earnings gain. For the first quarter, again excluding Amdahl, the group posted a 4% earnings gain.

Value Line, in a recent report, predicted earnings growth for the industry of about 12% this year.

Now coming out of its earnings slump, IBM is expected to be a formidable competitor in the coming years. In well-publicized statements made at a recent meeting, IBM said it plans to compete in all segments of the information processing market, becoming competitive on a "box-by-box" basis with other manufacturers. This is a product and marketing approach significantly different from the company's traditional top-down marketing approach which avoided subsystem competitive comparisons and stressed bundled prices, the Kidder, Peabody report noted.

IBM also has said it will use new marketing tools such as radio advertising, direct mail, telephone sales, volume discounts and the opening of retail stores.

Orders & Installations

Alanthus Data Communications Corp. has ordered 1,000 Telecommunications Storage Units (TSU) and Flexifile 21 disk storage subsystems from Tri-Data.

National Bank of North America is installing an IBM on-line banking system with more than 1,000 computer terminals to provide automated customer services.

The Braegen Corp. has been awarded a contract for PDP-11-compatible disk subsystems valued at more than $300,000.

The New Hampshire State Liquor Commission has placed a $1.2 million order with Data Terminal Systems, Inc. for point-of-sale (POS) systems and communications subsystems.

Scientific-Atlanta, Inc. has signed an agreement to supply digital satellite earth stations to American Satellite Corp. through 1982. Entertainment and Sports Programming Network has also ordered a major new satellite earth station from Scientific-Atlantic, Inc.

United Airlines has ordered $5.1 million worth of Honeywell, Inc. terminals, including both SPD 1525 systems and Model 1501 visual display units.

Kawasaki Motors, U.S.A. has ordered 600 registered 1,200 bit/sec modems from Codex Corp.

Bob Jones University, Greenville, S.C., has signed an agreement for the purchase of a computerized telephone system from F/S Communications Corp.

Cado Systems, Inc. has signed an agreement to purchase almost $1 million worth of rigid disk drives from Pertec Computer Corp.

Harold Beck & Sons, Inc. has ordered a 90/30 system and the Univac Unis program for manufacturing control. The Austad Co., a midwest distributor of recreational equipment, has also ordered a 90/30 system from Univac.

Citibank N.A. has ordered equipment from Recognition Equipment, Inc., including five Trace systems, valued at $2.2 million.

CSI Sees Steady Growth in Net Processor Sales

By Ann Dooley
CW Staff

SAN JOSE, Calif. — The communications processor industry will undergo dramatic changes in scope, but sales will remain strong during the next five years, reaching $1.2 billion by 1984 — a compound annual growth rate of 19.4%, a report by Creative Strategies International (CSI) indicated.

According to CSI, small independent vendors of communications processors are disappearing: Action Communications Systems was acquired by Plantronics, Comten, Inc. was acquired by NCR Corp. and Tran Telecommunications Corp. was acquired by Amdahl Corp., all within the last several years.

Only Computer Communications, Inc. remains a viable firm dedicated to communications processors, and that is doing only about $20 million per year in revenues, CSI maintained.

The recent Federal Communications Commission ruling allowing AT&T to compete in DP will have a significant impact on the market, according to the market research and consulting firm.

AT&T's Advanced Communications Service will incorporate many of the communications processing functions in the network itself, reducing the need for network controllers, front-end processors and message switches, the report noted.

Hardware Market

The market for data communications hardware — modems, multiplexers, communications processors and assorted peripherals — was $1.13 billion in 1979. By 1981, the market will grow to $2.93 billion, a compound annual growth rate of 21%, CSI predicted.

Communications processors are the largest segment of the hardware market, with revenues of $494 million last year. Communications processors will grow at a compound annual rate of 19.6% to $1.2 billion in 1984, CSI predicted.

Front-end processors, accounting for 31% of communications processor revenues, will continue to dominate, according to the report. Remote concentrators account for 21.3%, network controllers account for 17.7% and message-switching systems account for 10%.

The message-switching segment shows the most growth, with an expected compound annual growth rate of 22.4%, and the remote concentrator segment shows the least growth, a 14.2% compound annual growth rate to 1984, according to CSI.

International markets will also experience high growth opportunities, although competition will increase as European suppliers enter more strongly into the market.

The leading competitors in the market are the mainframe computer manufacturers, with IBM dominant in three of the four market segments.

Honeywell, Inc., NCR, Digital Equipment Corp., Burroughs Corp., Control Data Corp. and Univac are all among the top nine competitors, the report noted.

With the increased complexity of network architecture and the host processor defining communications protocol, users are looking to the host processor vendor for communications processors, as well.

Providing a concise analysis of the market and individual equipment, the report costs $995 from CSI at Suite 275, 4340 Stevens Creek Blvd., San Jose, Calif. 95129.

EDP SECURITY

DISASTER PLAN

METHODOLOGY

Over 20 major corporations have purchased our methodology in first quarter 1980.

Hundreds of companies have learned how to develop a disaster plan at our 3 day workshops.

1980

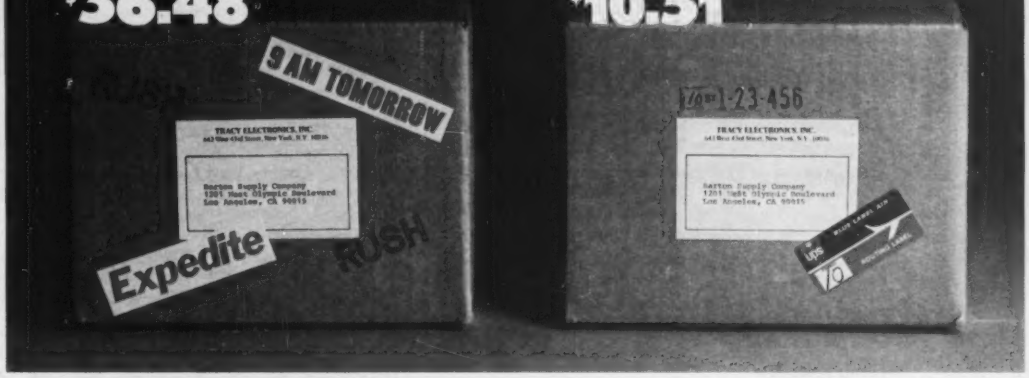
Montreal	Aug. 13-15
Chicago	Sept. 15-17
Boston	Sept. 24-26
Atlanta	Oct. 22-24
Houston	Nov. 17-19
San Diego	Dec. 10-12
Key Biscayne	Jan. 21-23

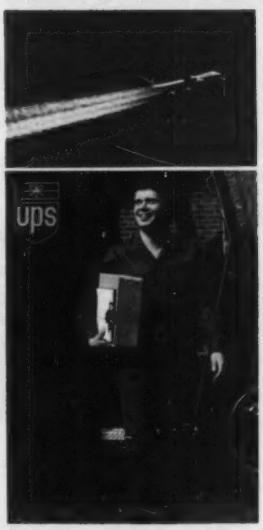
EDP SECURITY, INC.
400-2 Totten Pond Road
Waltham, MA 02154
(617) 890-5486

If you don't need overnight, why pay for it?

A ten lb. package between New York and Los Angeles by overnight air costs about $36.48

Same package shipped by UPS BLUE LABEL AIR Two Day Service. Cost $10.51





United Parcel Service gives you an alternative to expensive overnight air delivery—Blue Label Air. It's the dependable two-day air service that can save up to 70% or more on every package you receive. And a tremendous amount of money at the end of a year.

Blue Label Air is a service of UPS. So that means dependability...a service you can rely on. Orders are delivered right into your hands, at no extra charge. And each package is automatically covered up to $100 against loss or damage.

Remember, we're not asking you to forget about overnight air delivery. For truly urgent shipments, it's invaluable. But for those deliveries that can fit a two business-day delivery schedule, Blue Label Air is the money-saving alternative you've been looking for. And with our recently expanded service area, we're helping more people save more money every business day.

Start saving today—Route your orders by Blue Label Air.

Rate effective 5/1/80

UPS shippers receive automatic daily pickup service for a nominal weekly charge.

UPS BLUE LABEL AIR
The money-saving two-day alternative.

ups

Verbatim Drops Rigid Disk Line

SUNNYVALE, CALIF. — Verbatim corp. is discontinuing its program to develop a line of rigid disk products.

The company said its decision to discontinue the program was based on its assessment that the return on its investment as well as the profit potential would be less attractive than initially anticipated, primarily because of the company's evaluation of changes in rigid disk market conditions.

The discontinuance of the rigid disk program results in a substantial charge to expense in the company's fourth quarter, which ended June 30, from the writeoff of certain equipment and the provision for costs to be incurred in winding down the program. In addition, the financial rusults for the fourth quarter will be adversely impacted because of sales being lower than forecasted, the company said.

As a result, the company will report a loss for the fourth quarter ended June 30.

Symposium Set for October On DOD Electronics Market

LOS ANGELES — "The Department of Defense (DOD) Electronics Market — Forecast for the 80s" symposium to be held here Oct. 7-9 will provide an analysis of the key issues impacting mid- to long-term defense planning and the technologies that will be impacting systems Requirements during the decade.

Sponsored by the requirements Committee of the Electronic Industries Association's (EIA) Government Division, the symposium will be comprised of four segments: "Major Defense Issues for the '80s," "Defense Issues as Viewed by DOD Executives," "EIA's Look at the 1980-1990 Defense Electronics Market" and "New Initiatives and Technology Trends."

Registration fees are $200 for EIA members, $260 for nonmembers and $90 for government representatives. For more information, contact EIA, Government Division/Requirements Committee, 2001 Eye St. N.W., Washington, D.C. 20006.

CBI to Move to Minnesota

PALO ALTO, Calif. — The Charles Babbage Institute for the History of Information Processing (CBI) will be leaviang here to take up permanent residence at the University of Minnesota.

A nonprofit foundation that promotes research on the history of computers and computation, CBI was founded in 1977 by Erwin Tomash, founder of Dataproducts Corp.

CBI has instituted a number of activities, including an annual fellowship to graduate students working in the history of data processing. Roger H. Stuewer, professor of history of science and technology at the university, will serve as acting director until a permanent director is appointed.

The University of Minnesota was chosen in preference to 13 other universities that submitted proposals.

Three Appointed As AEA Realigns

PALO ALTO, Calif. — In a major staff reorganization by the American Electronics Association (AEA) in response to 24% growth in membership last year, Barton A. Scowley, Charles Elkind and William H. Phillips Jr. have been appointed to three new vice-president positions by the association's board of directors.

As vice-president for membership, Scowley is responsible for member and nonmember contacts and will supervise AEA's member relations staff in its offices in Palo Alto, Los Angeles, Orange County, New England and the metro New York area.

Elkind becomes vice-president of communications and industry services. An AEA vice-president since 1973, he has headed the association's Southern California operations for the past 14 years.

Phillips, named vice-president of finance and administration, will be responsible for financial planning and budget control. He has been AEA's staff financial executive since joining the association in 1977.

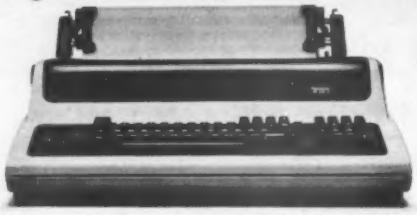
Commerce Approves Data Link Standard

WASHINGTON, D.C. — A standard for advanced data communications control procedures (ADCCP) has been approved by the U.S. Commerce Department and published as a National Bureau of Standards Federal Information Processing Standard (Fips PUB).

Fips PUB 71 defines the data link control procedures to be used by vendors of ADP equipment and services employing bit-oriented synchronous data communications links.

Further details concerning the standard are available from Eric L. Scace, System Components Division, Center for Computer Systems Engineering, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234.

Terminals now sold at Digital's Computer Stores.



DECwriter IV keyboard terminals and accessories.

LA34 - LA38

30 CPS, switch-selectable 110 and 300 baud rates. Pressure feed or tractor feed.

All terminals are cash and carry at attractive prices.

Digital's Computer Stores

Atlanta: 25 Park Place N.E. Trust Company Tower (404) 523-2105

Boston: 175 Federal St. (617) 482-0900

Chicago: 206 N. Michigan Ave. (312) 782-7406

Chicago: Woodfield Commons West 1037 E. Golf Rd., Schaumburg (312) 843-7857

Cincinnati: Central Trust Tower Fourth & Vine (513) 241-0888

Cleveland: 1903-5 E. 9th St. (216) 241-6180

Columbus: Borden Building 180 E. Broad St. (614) 463-1690

Dallas: 1625 W. Mockingbird, Suite 114 (214) 631-2520

Denver: 180 Fairmont Hotel Shopping Pavilion 555 17th St. (303) 825-5627

Detroit: 4000 Town Center, Southfield (313) 352-4780

Houston: 2 Post Oak Central 1980 South Post Oak Rd. (713) 840-0730

Long Island: Roosevelt Field 300 Garden City Plaza, Garden City (516) 741-6484

Los Angeles: Los Angeles Athletic Club Bldg. 435 W. 7th St. (213) 629-0121

Los Angeles County: 15436 Ventura Blvd., Sherman Oaks (213) 501-5256

Minneapolis: WCCO Building 629 2nd Ave. S. (612) 340-9250

New Hampshire: Mall of New Hampshire, Manchester (603) 668-4005

New York Downtown: 71 Broadway (212) 363-7023

New York Midtown: 43rd St. & Madison Ave. (at the Biltmore Hotel) (212) 599-0200

Orange County: 3390 Harbor Blvd., Costa Mesa (714) 540-4540

Philadelphia: 1500 Market St., Centre Sq. (215) 568-3530

Phoenix: 3800 North Central Ave. Rosenzweig Center (602) 277-4363

Pittsburgh: Kossman Bldg. Forbes Ave. & Stanwix St. (412) 765-2751

St. Louis: Northwest Plaza Shopping Center, St. Ann (314) 291-0774

San Diego: Central Federal Tower 225 Broadway (714) 232-0888

San Francisco: 369 Pine St. (415) 392-0284

Seattle: Pacific Plaza Hotel 1100 4th Ave. (206) 625-0302

Washington, D.C.: International Square 1850 K St., N.W. (202) 466-8926

digital

CICS/VS

COMMAND LEVEL PROGRAMMING COURSE

August 18-August 25, 1980 • 9 AM to 5 PM

This course is intended for application programmers destined to develop application programs under CICS/VS using the command level interface.

- Develop and maintain CICS/VS command-level application programs.
- Determine the trade-offs for the best use of the various CICS/VS facilities
- Make use of the basic input/output facilities of BMS as they relate to the IBM 3270 IDS or 3270 compatable terminals

Call COLLECT or write for complete information:

compEd

(212) 921-8676

1133 Ave. of the Americas, New York, N.Y. 10036

A subsidiary of Spindells & Associates, Inc.

*Early registration recommended.

Courses based upon Monday-Friday schedule

yes, Please send more information & registration forms.

Name _____

Co. Name _____

Address _____

City _____ State _____ Zip _____

Work/Study Programs Train Employees for Advancement

• *Honeywell Enrolls 20*

BOSTON — In an effort to meet its increasing need for computer technicians, Honeywell, Inc. has started a "classroom in the factory" program.

Currently being conducted at the company's facility here, the pilot project allows 20 employees to attend classes Monday through Friday for four hours and then spend four hours working.

The program is a joint effort by Honeywell and Bunker Hill Community College, one of the state's two-year public colleges.

The goal of the program is to train employees to become skilled technicians on a full array of Honeywell's small computer systems and terminals.

Upon completion of the seven-month program, students receive 35 college credits from Bunker Hill Community College.

Students enrolled in the program are taught basic electronics, digital electronics, basic computer theory, an introduction to software, microprocessor architecture and applications and firmware concepts.

The company and the state college are sharing the costs of the program, which in part will be defrayed by a grant from the state's Division of Occupational Education.

The creation of the program is Honeywell's response to Massachusetts Governor Edward J. King's call for more cooperation between industry and education.

On hand to formally announce the program, Stephen G. Jerritts, president of Honeywell Information Systems, said he considered the program a way of better matching up the school curricula and the skills needed by industry.

• *Wang Program Graduates 18*

LOWELL, Mass. — Members of the first graduating class of the Twilight Technical Training class at Wang Laboratories, Inc. here have either already advanced into new jobs within the company or are expecting to do so soon.

Eighteen manufacturing employees participated in Wang's recently implemented work/study program. They volunteered for the program in order to advance their careers by increasing their technical knowledge.

Six months after the course began, 11 of the 18 are working in new jobs and the other seven are in line for advancement, according to a Wang spokesman.

The program was open to any Wang employee who had been with the company a minimum of six months. Throughout the six-month course, the 18 participating employees were excused two hours early from their jobs on Monday through Thursday to attend the four-hour classes. The students donated two hours of their time and Wang donated two hours of company time in a cooperative effort, the spokesman said.

Divided into two academic sections — digital and analog — the course was deemed a success by management as well as by the participants, all of whom completed the program.

"We are striving for growth at all levels," Vice-President of Manufacturing Jon Kropper stated. "Most corporations view advancement strictly, almost religiously, at the managerial level; we view it, rather, in the broader context, which allows us to take diverse, small currents throughout the company and create major updrafts," he said.

Contracts

Functional Automation Gould, Inc. has been awarded a $62,000 contract by Andover Controls Corp. for production of a multi-building data acquisition, energy control and report-generating system.

Tymshare Travel Management Services has signed a multiyear contract with Trans World Airlines to provide TWA with a new multiaccess terminal service for use by travel agencies nationwide.

Infotron Systems Corp. has been awarded a $3,600,000 contract by Western Electric to supply more than 1,200 of its Timeline 280 and Timeline 290 synchronous time division multiplexers.

Lundy Electronics & Systems, Inc. has received a $3,798,620 order for expansion of the presently installed Lundy Data Entry System at the UK National Girobank.

The Mil-Spec Computer Division of Rolm Corp. has received a contract for 81 Model 1602B advanced logistic designed computer systems from the Communications and Development Command of the U.S. Army for integration into its Teampack electronic warfare system.

Spear Associates, Inc. has been awarded a $2,699,321 small business contract by the Air Force Systems Command's Electronic Systems Division to build seven airborne test antenna sets.

Computer Network Corp. has been awarded a major contract with a federal government agency to provide full-service facilities management processing with dedicated mainframe, communications, peripherals (tape and disk) and operations personnel.

Science Dynamics Corp. has signed an agreement to provide computer services to a group of 12 Southern California cities. The contract amounts to $2.5 million and extends through June 1984.

The New Standard For PDP-11 Disk System Technology
RM03 RM05 RM07

Only System Designed Just for PDP-11 Family
Designed exclusively for DEC's UNIBUS or MASSBUS CPU's. On the UNIBUS, it's just one card that plugs into any spare SPC slot. On the MASSBUS, four cards plug into any spare existing RH70 standard back plane.

Same Disk Drive as DEC RM02-03, RP06 and RM04-05
We use the same disk manufacturers as does DEC. The RM02-03 is the 9762 CDC 80MB and the new RM04-05 300MB is the CDC 9766. Only the LOGO is different.

Transparent to All DEC Software, Diagnostics and Drivers
You bet! Use your existing Software. . . no change needed. Runs all DEC's Diagnostics plus has its own. Fully emulates DEC disk Drivers.

Worldwide Installation and Maintenance
Through Data Systems Services, maintenance and installation is provided via CDC for both Drive and Controller. We also offer full PDP-11 system support.

Full Media Compatible?
That's right! You can read or write on our drives. Put it on DEC's and it will play or vice versa. TRULY MEDIA COMPATIBLE.

Compare These Prices

DRM02-3	80MB Slave	$ 8,995
DRJM02	80MB + Controller	$15,995
DRWM03	80MB + Controller	$17,995
DRJM04-5	300MB Slave	$16,995
DRJM04	300MB + Controller	$23,995
DRWM05	300MB + Controller	$25,995
RJM07	600MB + Controller	$32,995
RWM07	600MB + Controller	$34,995
RM07	600MB Slave	$24,995

OEM Discounts Available

(714) 770-8024

22642 Lambert, Suite 408
El Toro, CA 92630

DATA SYSTEMS SERVICES

PDP and DEC are registered trademarks of Digital Equipment Corporation.

POSITION ANNOUNCE-MENTS

ID Graphics

Our graphics industry clients nation-wide, both vendors and users, have retained us to help in their rapid expansion. If you have mini-computer oriented operating systems or scientific applications experience, at programmer through management levels, we would like to talk to you to see if your skills and objectives match these highly desirable opportunities. Write or call today at no cost or obligation.

Call Jim Bond, toll-free at 1-800-243-9661.
Connecticut residents, call 528-9393.

Identity Search
A division of Dunhill of Hartford
111 Founders Plaza East Hartford, CT 06108
All fees are assumed by client companies
1-800-243-9661

PROGRAMMERS
ANALYSTS
SYSTEMS ANALYSTS
NORTHEAST, NEW ENGLAND
SOUTHEAST, MIDWEST

When making a career decision, you should have a choice of options.

Our clients — who are large and small leaders in manufacturing, high technology, leading computer/peripheral co's, insurance, banking, and consulting — seek individuals with programming, analytical and/or leadership ability.

We individualize our search to meet your career objectives and geographical preference.

Investigate professional opportunities offering a variety of challenges and environments.

Phone collect or forward your resume to ERWIN KLAGGE.
(203) 525-8163

cp computer professionals
Data Processing Placement – Executive Search
15 Lewis Street, Suite 105, Hartford, CT 06103

A world of opportunity for tomorrow-minded Computer Systems Engineers at Martin Marietta Aerospace in Denver where all systems are

You'll find a career with Martin Marietta secure, challenging and rewarding. Today, you could be working on any number of long-term projects including the Space Shuttle, Missile X, and in areas such as command and information systems, spacecraft, launch vehicles, and solar energy.

And, working in our Denver facility, adjacent to the Rocky Mountains, means you'll have every opportunity to enjoy a wide array of recreational activities as well as educational and cultural facilities that rival any metropolitan area.

Computer Systems Engineering positions, emphasizing hardware/software system design, are open in the following specific functions and skills:

Computer System Analysis and Requirements
Requires experience in definition of computer system resource requirements, baseline through detailed functional analysis, sizing and timing studies and simulation.

Computer Systems Architecture Selection and Design
Requires experience in providing architecture selection criteria, hardware/software/MMI allocated requirements, baseline and computer systems definition.

Hardware, Software and Man-Machine Interface
Requires experience in developing Part I or "B" specification of the allocated computer system baseline.

Computer System Integration and Verification
Requires experience in providing system compatibility analysis, system synthesis, hardware/software integration and the system verification requirements.

Advanced Systems Concepts and System Simulation
Requires experience in providing project advanced computer systems concepts and project application oriented end-to-end simulations.

Positions available at all entry levels for spacecraft, missile and ground computer systems application. Some positions require EBI's.

Other opportunities available at Martin Marietta in Baltimore, MD; New Orleans, LA; Orlando, FL; and Vandenberg A.F.B., CA.

Martin Marietta offers an excellent employee benefit program.

If interested, please call Mr. Tom Patterson, Manager Computer Systems Engineering, COLLECT at (303) 977-5221, or send your confidential resume to: Personnel Department, Martin Marietta Aerospace, P.O. Box 179, Mail #D-6310, Denver, CO 80201.

An Affirmative Action Employer actively seeking the Handicapped and Veterans

MARTIN MARIETTA

Programmer

SR. SYSTEMS ANALYSTS

Smith Tool, a world leader in the development, design and manufacture of rock bit tooling for the vital oil and gas industries, has new openings in its Irvine facility for Senior Systems Analysts.

The ideal candidate, preferably with a 4-year degree, will have experience in Sales and Distribution.

We offer an outstanding compensation/benefits package that includes medical, dental, vision and life insurances, retirement, educational reimbursement, 2 weeks' paid vacation and 12 paid holidays. For immediate consideration, please send your resume in complete confidence to: Employee Relations.

SMITH TOOL
Division of Smith International, Inc.
17871 Von Karman Avenue
Irvine, CA 92713
An Affirmative Action Employer M/F

Florida

Many statewide career opportunities are currently available for experienced programmers, analysts, and software programmers. If you have at least two years experience on any large mainframe and wish to locate in the land of sunshine and low taxes, call or write:

BRUCE HILTON
ADVANTAGE EXECUTIVE SEARCH
7967 Bird Road
Miami, Fl 33155
(305) 264-7068
NO FEES NO CONTRACTS

State of
ALASKA
SYSTEMS PROGRAMMER II

Entry Salary, $34 - $37K (DOE) plus excellent benefits.

Position in Juneau, Alaska's dynamic capitol city. Area offers both cultural and wilderness activities amidst fjord-like scenery. Dual 3031's with VSI, CICS, Adabas. Experience required.

INQUIRE: Recruitment Coordinator, Pouch C-201, Juneau, AK 99811.

AN EQUAL OPPORTUNITY EMPLOYER

TIRED OF THE BIG CITY

You owe it to yourself to investigate a career with the Missouri Department of Revenue, in Jefferson City — Population 35,000.

MISSOURI WHY?????

I. Because we offer challenging opportunities working with very large applications and state-of-the-art new development in a dual IBM 3031 environment with MVS, TSO, CICS, IDMS and other selected software.

II. Because you can commute to work within 15 minutes from any area within the city and from most residential areas on the periphery.

III. Because the elementary and secondary education system ranks very high in quality and affords excellent choices between public and parochial programs.

IV. Because Missouri ranks 2nd from the bottom in State and local taxes.

V. Because this central Missouri community is located in a moderate climate in the heart of an abundant area of outdoor recreational opportunities. Floating on the Big Piney, Meramec and Niangua Rivers. Boating, water skiing and fishing on the beatiful Lake of the Ozarks just 40 miles from Jefferson City.

REQUIREMENT: Minimum 3 years experience as a Programmer or Systems Analyst

If you are ready for a challenge and will provide the initiative, we will provide the opportunities for you to advance your career in this fast paced industry.

To learn more about us and for prompt and confidential consideration, please send your resume and salary history to:

Assistant Director
Information Systems Division
Department of Revenue
P.O. Box 629
Jefferson City, Missouri 65105

Computer Professionals:

HONEYWELL IS COMING YOUR WAY.

To Put The Challenge Back Into Your Career!

Join Honeywell in Distributed Systems Development and get involved in the technological excitement of the decade. Join Honeywell's Small Systems and Terminals Division, (SSTD).

It all takes place at our SSTD facility in Billerica, Massachusetts. Billerica provides easy access to the cultural, educational and recreational resources; is adjacent to the famed Route 128 electronics belt, just 30 minutes from Boston; and offers pleasant, affordable living.

Right now, we have openings for communications professionals to join us in software development using our tremendously successful Level 6 minicomputer. In fact, we are willing to train qualified individuals, if you have related experience in the telecommunications field. If you join us now, you may participate in one or more of the following areas:

- *Workstation Emulators*
- *SNA Network Connection Services*
- *Systems Communications Supervisors and Drivers*
- *Network Administration and Control*
- *Network Maintainability*
- *Message Management Services*
- *Network Communications and Routing*
- *Terminal Management*
- *Other Network System Applications*

For qualified individuals who are looking to get involved with the challenge and excitement of network and communications development, we invite you to join us now!

Other positions are also available in other areas of Software and Hardware Engineering, as well as many of our Support Groups. We are seeking qualified individuals specifically for:

- *Software Engineering*
- *Hardware Engineering*
- *Quality Engineering*
- *Manufacturing Engineering*
- *Field Software Engineering*

MAJOR CITY INTERVIEWS

WASHINGTON D.C.

NEW YORK, N.Y.

CHICAGO, ILL

COCOA BEACH, FLA

Members of our Technical Management will be interviewing in the above cities within the next four weeks.

To prearrange an appointment, please forward your resume or brief note, to Lou Sinagra, HONEYWELL SSTD, MS-804G, 300 Concord Road, Billerica, MA 01821.

An Equal Opportunity Employer M/F

Honeywell

People, Our Competitive Edge

COMPUTER NETWORK PROTOCOLS

COMPUTER SCIENTISTS or **COMPUTER SYSTEMS ENGINEERS** needed to:

perform laboratory studies of high-level network protocols,

conduct research in distributed databases, network operating systems, and protocol design,

participate in national and international voluntary standards processes to develop computer network protocols, and,

direct the technical aspects of a contracting program to develop protocol standards.

Desirable experiences include the design and implementation of computer network protocols, an understanding of operating systems principles, uses of high level programming languages, work with technical committees, and contracting. A graduate or undergraduate degree in Computer Science or a related field is required.

The position offers competitive salary, excellent career benefits and professional growth opportunities. Grade levels range from 11 to 14 depending upon qualifications and experience. Please send your resume to:

U.S. Department of Commerce
NATIONAL BUREAU OF STANDARDS
Institute for Computer Sciences and Technology (CW)
Room B212, Technology, Washington, D.C. 20234

NBS, a Federal Government agency, is located in modern facilities near Washington, D.C., and is an affirmative action and equal opportunity employer. U.S. Citizenship Required.

Experienced Programmers and Analysts

Send resumes to: Mark C. Grove, Recruiting Office, Ætna Life & Casualty, 79 Farmington Avenue, Hartford, CT 06156, (203) 273-6828. An equal opportunity employer.

Ætna
LIFE & CASUALTY

Analysts, project leaders, programmers with more than a year's experience let us help you find a better job. For a decade we have been placing EDP professionals like you all over the country through our network of 25 national offices. Send your resume or call

Electronic Systems Personnel
1716 Midwest Plaza Bldg.,
Mpls., MN 55402

client companies assume our fee.

eep
EDP Placement Specialists
A Member of National Computer Associates

DATA BASE ADMINISTRATOR

Position with a rapidly growing electric utility in North Dakota. Responsible for design and maintenance of data base systems, including data structures, file relationships and monitoring data base activities. Experience in data base management required. Large scale Honeywell system utilizing DMIV/IDS II software. Competitive salary and excellent fringe benefits. Send resume in confidence to:

BASIN ELECTRIC POWER COOPERATIVE
ATTENTION: PERSONNEL
1717 EAST INTERSTATE AVENUE
BISMARCK, NORTH DAKOTA 58501

AN EQUAL EMPLOYMENT OPPORTUNITY EMPLOYER

Systems Manager

Upgrade Distributed Processing Systems

ARCO Coal Company, a major division of Atlantic Richfield, is involved in mining large coal deposits in several western states and in the development of synthetic fuels through coal gasification and oil shale processing.

These projects, and the expansion we've experienced, have created the need for an individual who can develop and support distributed systems in a multiple location (Colorado, Wyoming, Utah), multiple computer (IBM 303X, PDP 11/70's and 11/44) environment. Primary responsibility will be the installation and system support of the ARCO Coal Data Network, including NODES at Black Thunder, Wyoming and Denver, Colorado. You will also serve as a technical consultant to field operating units and software development groups within ARCO Coal Company.

Position requires a Bachelor's degree in Computer Science or equivalent work experience, and 5+ years of data processing experience that includes 2-3 years with the RSTS/E operating system on a PDP 11 functioning under Decnet Phase 1. One to two years' experience with IBM OS/VS and JCL is also necessary, as is the ability to communicate effectively. Macro-11 programming background required. Some travel necessary.

We offer an excellent starting salary, relocation assistance, and comprehensive benefits that include dental insurance. For prompt consideration, send your resume and salary history to: **C. M. Monheiser, ARCO Coal Company, P.O. Box 5300, Denver, CO 80217.**

ARCO Coal Company
Division of AtlanticRichfieldCompany

An equal opportunity employer

Manager/Systems Development

for our Northwest Operations

A business visionary ... a positive thinker ... a doer ... a stick-with-it achiever ... a morale builder — that's all!

That's all we need in a person to manage Crown Zellerbach's Northwest Systems Development in Portland — a facility which services our Pulp and Paper and Timber and Wood Products business units with significant investment in on-line systems, and whose IBM 3031 is currently in a conversion from DOS to MVS.

Of course technical qualifications must accompany the management, personal and interpersonal ones, such as experience in applications design, coupled with some experience in marketing, manufacturing and distribution applications.

**** And what can this exceptional person expect from Crown Zellerbach?***

**** You can expect a handsome salary and 25 people to supervise and motivate. Your involvement in New Business Development will stretch your mental muscle, and the fresh green Northwest will stretch your spirits. That's all!***

Crown Zellerbach is comfortable asking for a lot ... because we give a lot. For immediate consideration, please rush your resume, in confidence, to Deana St. John, Room 802F, Crown Zellerbach Corporation, One Bush Street, San Francisco, CA 94104. (415) 823-7110. Individuals only apply. An equal opportunity employer through Affirmative Action.

CrownZellerbach

data processing

CAREER OPPORTUNITIES

Blue Cross and Blue Shield of Kansas City, a leader in the health insurance industry, has immediate opportunities for DP professionals to expand and develop their skills in business and insurance applications.

SENIOR SYSTEMS ANALYSTS

Must have previous experience in total development and implementation of large systems using data base concepts. Leadership abilities and excellent communication skills provide growth potential.

PROGRAMMER ANALYSTS

Strong COBOL programming ability including some analysis and design background and user interface experience is required.

SENIOR PROGRAMMERS

Solid COBOL coding, testing and debugging experience is required. IMS coding and structured programming techniques strongly preferred.

Our environment consists of an IBM 3032 to be operating under MVS with IMS DB/DC. We offer flexible hours, highly competitive salaries, and excellent benefits including a dental plan, credit union, educational assistance and relocation package. Previous experience in a Blue Cross and Blue Shield or similar environment is preferred. For immediate consideration, call Kathy Jensen, collect, 816-932-5262, or forward your resume, in confidence, to her attention.

Blue Shield
Blue Cross
of Kansas City

Blue Cross and Blue Shield of Kansas City
P.O. Box 169
Kansas City, Mo. 64141

Equal Opportunity Employer M/F

EDP/MIS Professionals New England/East Coast/ Nationwide

Robert Kleven and Co., Inc. has a wide variety of positions available in programming, Systems Analysis/Design, Data Base Applications, Applications Programming and Software Support for professionals well versed in the field. If your experience covers one or more of the following areas, contact us: Technical Support; COBOL/IMS/CICS/ DOS/OS/VS/ VM/MVS Programming/Design; Assembly or Higher Level Language Programming; Data Base Design/Utilization; Technical Writing.

We've been providing Confidential and Industry-Knowledgeable placement for MIS professionals since 1969. We can also provide you with free resume preparation and career path counseling. Client companies assume all fees. **Contact: Simone Zani**

Robert Kleven and Co., Inc.
INDUSTRIAL RELATIONS MANAGEMENT CONSULTANTS

Three Fletcher Avenue, Lexington, Massachusetts 02173
Telephone (617) 861-1020

Member
Massachusetts Professional Placement Consultants
National Computer Associates.
(Offices Nationwide)
Representing Equal Opportunity Employers M/F

PROGRAMMER/ ANALYST

Starting Salary to $26,000

Voplex Corporation, a multi-divisional, major plastics manufacturer located in Rochester, New York, seeks a proven professional to take on major Programming/Analyst responsibilities for our System/3 Model 15 D/CCP.

This position reports directly to the Corporate Data Processing Manager and requires experience in diversified manufacturing applications. Complete knowledge of RPGII is a necessity.

In addition to the salary, we offer an excellent comprehensive benefits package in excellent working surroundings. Please reply in confidence by resume, including salary history, or by *calling: COLLECT*

Mrs. Phillips

716-248-5350
P.O. BOX 64
ROCHESTER, NEW YORK 14601
an equal opportunity employer

VOPLEX CORPORATION

PROGRAMMERS

IMS SYSTEMS PROGRAMMERS
IMS APPLICATION PROGRAMMERS
IMS SYSTEMS ANALYSTS

Evangelical Christian Ministry seeks qualified Computer Programmers experienced in programming, maintenance and design. Degree desired but will give credit for appropriate experience. If you are qualified and have a desire to serve, please send resume to: **CBN Personnel, CBN Center, Virginia Beach, VA 23463. CBN is an equal opportunity employer.**

DP PROFESSIONALS

Advance your career in the location of your choice!

If you have a minimum of 1 year of experience, call collect (or send resume) to: **Betty deMartelly**

DEALY ROURKE PERSONNEL
1808 West End Bldg.
Suite 121
Nashville, Tenn. 37203
(615) 329-1771

ROBERT HALF

PACIFIC NORTHWEST
Washington, Oregon, Idaho & Alaska

A great place to visit — a better place to live. Healthy economy and environment.
We have clients from the Northern Rockies to the Pacific Coast and on up the Northwest Passage to Alaska.

Managers Auditors Analysts Programmers

Visiting here? Call collect, send resume or drop in to talk over current job openings and set up interviews for you.

Ray Magill, CDP
ROBERT HALF
of Seattle, Inc.
1301-5th Avenue
Suite 2626
Seattle, Wash. 98101
(206) 624-9000

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 SW Columbia
Suite 650
Portland, Ore. 97258
(503) 222-9778

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 709 FRAMINGHAM, MA 01701

postage will be paid by

CIRCULATION DEPARTMENT

COMPUTERWORLD

375 Cochituate Road, Rte. 30
Framingham, MA 01701

Detach here, moisten and seal envelope securely before mailing.

Fold and insert order form (attached through binding) and remittance here.

position announcements | position announcements | position announcements | position announcements | position announcements

RPG II
Fantastic opportunity for DP professional with this WORLD RENOWNED Fortune Company. 2+ years RPG II programming with SYSTEM 3 or 34 experience. All commercial applications in multi-SYSTEM 34 environment. Very well organized. $25,000

BASIC RSTS
Career climbing opportunity for up-and-coming technical pro. 1+ years BASIC programming in RSTS environment. Time sharing and statistical applications experience a definite plus. Outstanding benefits include 30 DAYS VACATION. Oppty to learn COBOL. $26,000

PL/1 OS MVS
Professionalism at its best in pleasant working surroundings. 2+ years PL/1 programming experience. Financial applications experience is a plus. Environment is 370/158 OS MVS, CICS, TOTAL. Outstanding training programming with plenty of room for growth. $26,000

MANAGER DEC PDP 11/70
Attractive management position for shirtsleeve DP PRO. 2+ years Management with 3+ years BASIC programming under RSTS and manufacturing applications experience. COBOL programming experience is a plus. Applications are financial on DEC PDP 11/70. Challenging and highly visible. $30,000

ALL FEES PAID
Call: MARTY AMATO

ROBERT HALF
OF NEW YORK, INC.
522 Fifth Avenue
New York, N.Y. 10036
212-221-6900 (agency)

PROGRAMMER ANALYST
Position requires two years experience in design of computer applications. Experience using Honeywell 6000 level 66 series, supervisory capabilities and good communications skills desirable. Excellent salary and fringe benefits. Send resume in confidence to:

BASIN ELECTRIC POWER COOPERATIVE
ATTENTION: PERSONNEL
1717 EAST INTERSTATE AVENUE
BISMARCK, NORTH DAKOTA 58501

AN EQUAL EMPLOYMENT OPPORTUNITY EMPLOYER

S/34 TECHNICAL
Small, growing software firm specializing in business systems for S/34's has openings for individuals who enjoy programming and want to move ahead in a technical staff capacity. Send resume and salary requirements to **Bob Newman**

J.D. Edwards & Co.
Two Denver
Technological Center
Englewood, CO 80111

DALLAS
OS/MVS INTERNALS
Strong software systems background in Data Base/Data Communications. DL/1, CICS a plus. Super company with good benefits. Salary to high $20's.

Suite 1109, Stemmons Tower W
Dallas, TX 75207. (214) 637-6360
DATA PROCESSING CAREERS INC

"I don't want to

—write letters
—send out resumes
—give my name to employment agencies
—waste my time on useless interviews

"But I would like to get specific information about jobs that interest me."

For the first time, recruiting managers can write job descriptions and interactively search a data base for abstracts (resumes) that meet their specific requirements. They can refine or modify their criteria to reduce the selection of resumes to those most qualified or, if necessary, to increase the number of possible candidates.

If your resume is among those available in this data base and it is selected, you will receive the job description which selected it; mailed within one day. You can respond or not as you decide.

The name of this unique employment information system is PAR (Professional Abstract Registries). It is the most efficient, direct means of exchanging needed information between a qualified engineer or computer scientist and an interested employer without violating the privacy of the professional or wasting the time of the employer.

The PAR data base is unique because it permits the entry of full professional abstracts and enables the employer to search their entire content.

The software program at the heart of this system, first developed for searching technical documents, has been used for a decade. Only PAR's application is new.

Here's how PAR can work for you:

Not actively looking. You're satisfied with your position, but want to keep an eye on the market. PAR provides a continual reading on the current demand for your specific capabilities.

Starting to think about getting a new job. Which of your strengths should you emphasize? Where are your best opportunities now? PAR provides the information you need to make important career decisions.

Actively looking. You get virtually instant descriptions of relevant jobs, initiated by hiring managers who have located your abstract and determined that they are interested in you.

PAR gives you these unique benefits:

- **Direct.** Job description as prepared by hiring manager, not "interpreted".
- **Selective.** You are sent only job descriptions relevant to your own experience and objectives.
- **Fast.** When abstract is "hit", job description mailed within one day.
- **Private.** PAR identifies the job to you, not vice versa.
- **Retroactive.** When you first enroll, all unfilled, relevant, stored descriptions are searched and mailed to you.

PAR does not sell people or jobs; only information for those who need it.

For information on how to put the power and flexibility of PAR to work for you, call toll-free now, or mail coupon today.

PAR PROFESSIONAL ABSTRACTS REGISTRIES
A SERVICE OF DATA BASE INNOVATIONS, INC.

PAR is a nationally endorsed member service of the National Society of Professional Engineers.
Members of NSPE (and other participating societies) may subscribe at a reduced fee of **$10 per year.**

For immediate information or to subscribe, call toll-free
800-431-2616
In NY State, call
914-762-2522

Employers: Presentations now being scheduled in major Northeast cities. For information, call John Elsoffer at above phone number.

PAR, DataBase Innovations, Inc., 28 Lower Main Street, Ossining, NY 10562

☐ I wish to enroll now. Send me your Membership Subscription Package.
I understand that I may return it within 30 days for a full refund or cancellation of invoice.
☐ I enclose payment ($10 for NSPE members, $14 for others) ☐ Bill me
☐ Please send me full information.

NAME _____ SOCIETY ACRONYM _____
ADDRESS _____ MEMBERSHIP NO. _____
CITY, STATE, ZIP _____ SIGNATURE _____

UNIVERSITY OF PETROLEUM & MINERALS
DHAHRAN, SAUDI ARABIA

The College of Industrial Management will have faculty positions (all ranks) open for the academic year 1981-82, starting 1 September 1981 in:

BUSINESS DATA PROCESSING MANAGEMENT

Academic Qualifications and Experience
Minimum requirements include a Master's Degree in a relevant field, teaching and/or industrial experience, and/or CDP Certificate.

The College of Industrial Management is a young growing college, offering curricula equivalent to the standards of the AACSB. Research is encouraged and high quality proposals are awarded the university grants.

Language of instruction is English.

Minimum regular contract for two years, renewable. Competitive salaries and allowances. Air conditioned and furnished housing provided. Free air transportation to and from Dhahran each year. Attractive educational assistance grants for school-age dependent children. All earned income without Saudi taxes. Ten months duty each year with two months vacation with salary. There is also possibility of selection for university's ongoing summer program with good additional compensation.

Apply with complete resume on academic, professional and personal data, list of references, publications and research details, and with copies of transcripts and degrees, including home and office addresses and telephone numbers to:

University of Petroleum & Minerals
Houston Office
2223 West Loop South, Suite 410
Houston, Texas 77027

PROGRAMMER ANALYSTS
$24,798 — $30,442 /yr.
HEWLETT-PACKARD 3000 III

The City is seeking quality candidates with cobol experience for the maintenance of current and development of new on-line municipal applications. HP programming experience is desirable. Work hours available are: 8 hours — 5 days or 10 hours — 4 days per week.
The City offers excellent growth potential and a comprehensive benefits package including a fully paid State of California retirement plan (no social security deduction). The City offers salary increases through the above range in 5 steps over three and a half years. In addition, there are annual cost of living increases each July.

Filing Date: Aug. 8, 1980
Send resume or apply:
Personnel Services Office
City of Beverly Hills
450 N. Crescent Drive
Beverly Hills, CA 90210
(213) 550-4837

INPUT PERSONNEL
P.O. BOX 23757 • ST. LOUIS, MO 63121

"SUNBELT 'N MIDWEST AREA!"

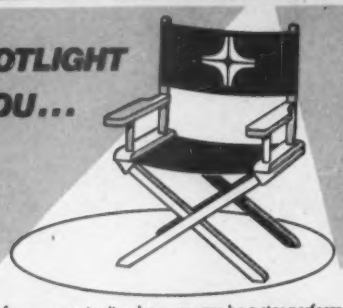
D.B.A. MGR.	TO 30K
PROJECT MGR.	TO 35K
SOFTWARE MGR.	TO 33K
PROGRAMMERS	TO 30K
EDP AUDITORS	TO 28K
SYSTEMS MGR.	TO 38K

ALL FEES, INTERVIEW AND RELOCATION EXPENSES PAID BY CLIENT.

FORWARD RESUMES TO:
INPUT PERSONNEL
P.O. BOX 23757 ST. LOUIS, MO 63121

position announcements | position announcements | position announcements | position announcements | position announcements

THE SPOTLIGHT IS ON YOU...



The spotlight is on you! Are you looking for an opportunity where you can be a star performer . . . center-stage? Join Sperry Univac's Mini-Computer Operations. Enjoy the benefits of being a member of Sperry Univac, long recognized as an innovative leader in the computer industry. Work within the individually oriented atmosphere of our Mini-Computer Operations in Orange County.

Mini-Computer Operations is launching a major new thrust in its mini-computer system and is seeking key individuals at all levels to join its Software Development team.

- **BREAK INTO THE MINI-COMPUTER FIELD** by joining our software team to provide technical expertise outside the development organization and solutions to customer installed systems. With a willingness to learn about new products, you will gain a broad background in overall mini-computer software design and applications.
- **SHARPEN YOUR DATA MANAGEMENT OR COMPILER DEVELOPMENT SKILLS** in our higher level language areas. Participate in the specification, design and implementation for an integrated file and database management system. Develop compilers that reflect the latest language standards.
- **EXPAND YOUR OPERATING SYSTEM BACKGROUND** to include our growing V77 mini-computer family. Work within our interactive, Pascal development environment to design and implement major new OS modules: scheduler/dispatcher, I/O resource management and memory management.

Our Software Development organization is heavily team oriented and is looking for key members who are eager to accept responsibility and move quickly into lead technical and managerial roles. Come, work with a team that is action-oriented, and enjoys responding to a technical challenge. Interact with hardware developers to formulate new system architect concepts and design.

At Sperry Univac, the individual counts, is listened to, makes the difference, determines the program success. We have a reputation of listening to our customers, our employees; we'll listen . . . to you . . . to your ideas . . . developing innovative solutions to our very complex technical projects. Let us evaluate your resume to see where you may fit within the variety of opportunities we have available to you.

A position with Mini-Computer Operations offers you a stable, rewarding career, accompanied by a compensation package that is second to none in the industry, and includes free dental insurance, 10 paid holidays as well as a comprehensive medical and life insurance plan. Submit your resume and salary history in complete confidence to the address below, or phone our Employment Department at 714/833-2400, Ext. 250, for additional information regarding these exceptional career opportunities.

SPERRY UNIVAC

MINI-COMPUTER OPERATIONS
2722 Michelson Drive • Irvine, CA 92713
A division of Sperry Corporation and an equal opportunity employer M/F

COMPUTER SCIENTISTS AND DIGITAL ENGINEERS JOIN CABLE TELEVISION INDUSTRY OF THE 80's

Cox Cable Communications, fourth largest cable television company offers software and hardware engineers:
- An opportunity to take an aggressive lead in the growth industry of the '80s.
- High visibility in an R&D environment, backed by top laboratory facilities and technical support.
- Location in Atlanta, the premier sun-belt city offering a cost of living 10% to 20% and housing costs 20% to 30% lower than comparable metropolitan areas.
- An attractive relocation policy and highly competitive salaries.

POSITIONS AVAILABLE

- Senior Software Engineers: Responsible for all aspects of system design including distributed processing, real-time allocation and control, data communications, system integrity and human factors.
- Senior Hardware Engineers with proven Digital and/or Rf design Background to assume Project responsibility on advanced System developments.

QUALIFICATIONS:

- Aggressive self-starter with a proven track record.
- Demonstrated ability to work with others.
- Proven capacity to handle full systems design issues.
- Five years applicable experience.

RESPOND TO:

Cox Cable Communications, Inc.

Director of Human Resources
219 Perimeter Center Pkwy
Atlanta, GA 30346
An Equal Opportunity Employer

JOIN US IN THE FUNBELT

PROJECT MANAGER

Business/technical degree or relevant experience plus:
- 2-3 years in complex systems design
- highly developed business and technical skills
- ability to interact at all levels

SOFTWARE SUPPORT MANAGER

Computer Science Degree preferred plus:
- 4-5 years systems software experience
- Honeywell GCOS experience or other operating system

Other applications and support positions available

This is YOUR OPPORTUNITY to get in on the GROUND FLOOR in the development of a sophisticated hospital information system . . . . located in charming, historic NEW ORLEANS, center of the FUNBELT.

We offer
- Top management commitment
- Latest hardware/software environment
- Professional development
- Advancement opportunity
- Transaction Processing/Database orientation

We need your expertise and experience.

Direct confidential inquiries to:

Employment Office
P.O.Box 2841
Baton Rouge, LA 70821
(504) 342-4235

* * * SENIOR * * *
PROGRAMMER ANALYSTS

SYSTEMS WEST is an established consulting firm that excels at developing and implementing systems in a project team environment.

Due to current project commitments and recent expansion we are seeking Senior Programmer Analysts with a minimum of three years of experience to complement our existing consulting staff in Canada and the U.S. If you enjoy developing new systems and are proficient in the following disciplines we want to hear from you.

***ONLINE DATABASE SYSTEMS. . . (IMS, TOTAL, IDMS)**
***STRUCTURED ANALYSIS & DESIGN**
***STRUCTURED PROGRAMMING. . . (COBOL, PL/1)**

The opportunity to diversify your professional skills and to function in a challenging environment awaits you. We offer excellent salaries based on performance, comprehensive benefits and profit sharing. If you want to be associated with an industry leader please reply in confidence to:

SYSTEMS WEST CONSULTANTS LTD.
SUITE 2506
425 CALIFORNIA STREET
SAN FRANCISCO, CA 94104
(415) 391-1933

SYSTEMS WEST CONSULTANTS LTD.
SUITE 360
10150-100 STREET
EDMONTON, ALBERTA, CANADA
(403) 425-1494

san francisco, vancouver, edmonton, calgary

OS/MVS
TSO

Tel 703/356-6630
Till 9 pm

PROGRAMMER-ANALYST
CICS-CMS

2 YRS + IN
COBOL, ALC OR PL/1
TO $36,000
NATIONWIDE

Cybermetrics Corporation
P.O. Box 579
McLean, VA 22101

EXECUTIVE SEARCH
FT. LAUDERDALE, FLORIDA

We are looking for a working partner to join us in our Ft. Lauderdale office. If you have software or computer sales experience this may be for you. Your investment is $12,500 and we will finance the balance. For more information call **E.J. Stephan at Cosmo, 800-327-7260.**

ARIZONA
Manager Installations and Customer Relations
Starting Salary To
45K

We are:
A medium-size turn-key house (Consulting — Systems Design — Hardware Procurement — Application Programming — Implementation — Post-Installation Service) We cater primarily to two vertical markets, implementing in excess of 100 systems per year.

We need:
An aggressive leader for an excellent and well established software implementation team. Responsibilities include Customer Education and Documentation.
The qualified applicant will have a minimum of 8 years of data processing and accounting experience including at least three years in management.

Service Bureau or software house experience will be helpful. Background in automotive or equipment dealer related areas desirable. You should be looking forward to working in excess of 60 hours per week.

Your challenge:
Rapid expansion with a well established turn-key house to handle our order backlog and growth. Advance to V.P. possible within 6 months.

Please do not waste your time or ours with a reply unless you ahve a proven track record in management and possess the minimum qualifications outlined above. A progressive achievement record is a must.

Your answer should be directed to: **President/ADS, P.O. Box 2088, Scottsdale, AZ 85252.**

position announcements | position announcements | position announcements | position announcements | position announcements

DATA PROCESSING
GROWTH AND OPPORTUNITY

Central Bank of Denver is currently planning the development and installation of a totally integrated banking system. We are seeking qualified candidates in the areas of System Analysis and Programming Analysis with 370 OS/MVS background. Banking experience would be a plus.

These positions offer a competitive salary and benefit pkg. as well as excel. oppty. for advancement. Please send resume in confidence to:

Central Bank of Denver
Staff Resources Dept.
1515 Arapahoe St.
Denver, Colo. 80293
Equal Opportunity Employer
M/F/V/H

TOWN OF GREENWICH
CONNECTICUT
COMPUTER PROGRAMMER II
$16,213-20-574

Considerable experience in computer programming and systems analysis. College grad or equivalent with major course work in computer science or related field. Excellent fringe benefit package. Resume to **Personnel Office, Town of Greenwich, Town Hall, Greenwich, CT 06830.**

An Equal Opportunity Employer, M/F

PROGRAMMER/ANALYST

Leading Beechcraft Sales and Service Center has immediate opening in Atlanta for individual with Honeywell experience using GCOS and TDS. Minimum of 5 years experience in Design and Programming; Inventory Control. Excellent salary and benefits package, includes pension and profit sharing.

Send resume to:
Jimmy Smallwood
Hangar One, Inc.
P.O. Box 20718-AMF
Atlanta, GA 30320

DIRECTOR OF COMPUTING AND INSTITUTIONAL RESEARCH

San Francisco State University is recruiting for the position of director of Computing and Institutional Research which reports to the university president. The ideal candidate should have direct management experience in all phases of data processing at a university or college installation; ie., research, academic and administrative services. Advanced degree with appropriate specialization required. The salary is negotiable from $33,264-$40,224. The university offers excellent benefits. Resume should be sent to **the University Personnel Office, San Francisco State University, 1600 Holloway Ave., San Francisco, CA. 94132.**

Deadline: Aug. 15, 1980

We are an Affirmative Action/ Equal Opportunity/Title IX Employer.

SYSTEMS ANALYST
PROGRAMMER/
ANALYST

Spring Mills, Inc., a leading textile manufacturer, is seeking an experienced data processor who also has a working knowledge of the MSA Human Resource System. If you qualify, please send your resume to:

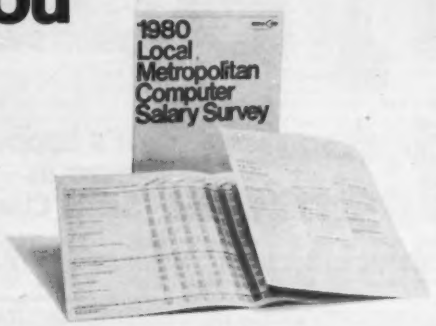
Personnel Manager
P.O. Box 111
Lancaster, South Carolina 29720
Or Call 803-286-2381

EQUAL OPPORTUNITY EMPLOYER

Computer Professionals...

Are you making as much money as you should be?

To find out, call today for our new local survey It's FREE!



Includes 23 New Categories

The 1980 Survey has been expanded to provide specific data for 23 new categories. These include positions in data communications, mini/micro programming, data base administration, technical marketing support and EDP auditing in addition to our traditional categories of programming, software, systems design, management and computer marketing.

Do you know how your salary compares with other EDP professionals in your specialty—with the same level of experience—working in your city, or in other cities across North America? Are you being well paid for what you do? Are salaries better elsewhere?

Now you can find out simply by calling today and asking for a copy of our current 1980 Local Metropolitan Computer Salary Survey. It's FREE!

Source Edp, North America's largest recruiting firm specializing in the computer field, publishes this valuable Survey annually as a service to computer professionals from coast to coast. The 1980 Survey shows current salaries in your area, 37 other areas in the U.S. and Canada, plus overall national averages. Salaries are shown by career specialty broken down by length of experience or size of computer system.

As you will discover, this Survey can be extremely valuable in helping you make important career decisions. Call for your free copy today.

For your free report, simply phone the Source Edp office nearest you.

source edp

If unable to call, write
Source Edp, Dept. CL4
100 South Wacker Drive
Chicago, Illinois 60606

(When writing, please be sure to indicate home address and position title). Client companies assume our charges.

United States		Indiana		Long Island	516/364-0900
Arizona		Indianapolis	317/631-2900	White Plains	914/683-9300
Phoenix	602/258-9333	**Louisiana**		**North Carolina**	
California		Baton Rouge	504/924-7183	Greensboro	919/378-1642
San Francisco	415/434-2410	New Orleans	504/561-6000	**Ohio**	
Palo Alto	415/856-0600	**Maryland**		Cincinnati	513/769-5080
Los Angeles	213/386-5500	Baltimore	301/727-4050	Cleveland	216/771-2070
Van Nuys	213/781-4800	**Massachusetts**		Columbus	614/221-2070
Torrance	213/540-7500	Boston	617/482-7613	**Oregon**	
Irvine	714/833-1730	Wellesley	617/237-3120	Portland	503/223-6160
San Diego	714/231-1900	**Michigan**		**Pennsylvania**	
Colorado		Detroit	313/259-7607	Philadelphia	215/665-1717
Denver	303/773-3700	Southfield	313/352-6520	King of Prussia	215/265-7250
Englewood	303/571-4450	**Minnesota**		Pittsburgh	412/261-6540
Connecticut		Minneapolis	612/544-3600	**Texas**	
Hartford	203/522-6590	St. Paul	612/291-2467	Dallas	214/387-1600
Stratford	203/375-7240	**Missouri**		Fort Worth	817/338-9300
District of Columbia	202/466-5890	St. Louis County	314/862-3800	Houston Central	713/751-0100
Florida		St. Louis		Houston	
Miami	305/624-3536	Downtown	314/231-4880	Suburban	713/626-8705
Georgia		Kansas City	816/474-3393	San Antonio	512/344-0217
Atlanta Central	404/588-9350	**New Hampshire**		**Virginia**	
Atlanta		Nashua	603/880-4047	McLean	703/790-5610
Suburban	404/325-8370	**New Jersey**		**Washington**	
Illinois		Cherry Hill	609/482-2600	Seattle	206/454-6400
Chicago	312/782-0857	Edison	201/494-2800	**Wisconsin**	
Northfield	312/446-8395	Paramus	201/845-3900	Milwaukee	414/277-0345
Oak Brook	312/986-0422	**New York**		**Canada**	
Rolling Meadows	312/392-0244	Midtown	212/736-7445	Toronto	416/865-1125
		Wall Street Area	212/962-8000	Don Mills	416/425-5730

Tomorrow's Energy is Today's Challenge

TECHNICAL SYSTEMS PROGRAMMER

Excellent and challenging career opportunity in Madison for experienced data processing professional. We have an IMMEDIATE NEED for strong systems programmer to facilitate MVS conversion from OS/VS1 on an IBM 3033N6. Will assist in the conversion planning and assume lead role in the installation, maintenance and tuning of the MVS SCP, TSO/SPF, JES2 and RMF.

Must have experience with VSAM, VSAM Master Catalog and Assembler. Excellent opportunity for motivated individual who desires crosstraining in related areas as: ACF/VTAM-NCP; IMS/DL1; CICS, FORTRAN, COBOL.

Offering competitive salary and excellent fringe benefit package. APPLY TODAY.
Submit your resume including salary history in confidence to:

Employment Supervisor

Wisconsin Power & Light Company

P.O. Box 192
Madison, Wisconsin 53701

An Equal Opportunity Employer m/f

SALES MANAGER

Comarc, the leader in Geo-based Information systems is looking for an experienced Sales Manager. The person we seek will have a minimum of three recent concurrent years of management experience over a national sales force. The candidate will also have been involved with large systems in the $200K to $700K range. A technical degree with supplemental training in marketing, sales, and personnel management is desired. Experience with computer graphics, DBMS or MIS will be a plus.

The successful candidate will inherit a staff of three, with scheduled expansion to five, international responsibility, and wide open career opportunities. The position reports to the President and pays $25K-30K, plus an override, profit sharing, and excellent company benefits. **Call or send resume to Kay Anderson, Comarc Design Systems, 315 Bay St. San Francisco, CA 94133; (415) 392-5300.**

CALIFORNIA

MAJOR TIMESHARING FIRM needs Technical Representatives in their Los Angeles office. These positions require past experience in Fortran prog'g. Mini-computer exp. is preferred but not req'd. Heavy client contact. **Salary to $25,000.**

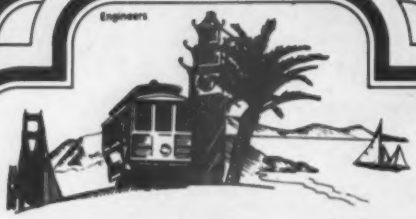
HEALTH SERVICES FIRM needs a Project Leader to assist in the development of an on-line accounting system. Environment is 370/158 (going to 3033) with CICS and COBOL. Excellent benefits. **Salary to $33,000.**

MAJOR FINANCIAL INST. seeks Sr. Systems Analyst with exp. in systems planning, system architecture or long-range planning. Successful candidate will join a team reviewing present systems (hardware & software) and developing systems to accomodate reqmnts. thru 1999. **Salary to $35,000.**

the jarvis walker group

3255 Wilshire Blvd., Suite 1503
Los Angeles, Ca. 90010 (213) 384-4900

position announcements | position announcements | position announcements | position announcements | position announcements



Software Engineers: It's happening here in Santa Clara Valley

A SHORT DRIVE FROM SAN FRANCISCO, CALIFORNIA, is where the engineering teams of GTE Sylvania continue to revolutionize the electronic defense industry through the research and development of realtime computer-controlled systems.

GTE Sylvania is a leading developer and manufacturer of sophisticated computer-based systems for the Department of Defense and related agencies. These are realtime, interactive systems which acquire and process electromagnetic signals. Their functions are distributed across multiple processors, are coded in structured languages, use data-base facilities such as DBMS-11, and are interfaced to sophisticated devices such as smart terminals, graphic display terminals, receivers, recorders and transmitters.

GTE Sylvania has a continuing need for innovative software professionals to staff our expanding work programs which involve design, development and support activities in the following areas:

Data base technology	Interactive computer graphics
Digital communication	Communication networks
Microprocessor controlled systems	Distributed processing

APPLICATIONS SOFTWARE..... Design and develop realtime software systems. Programming is done in high level languages (PASCAL, FORTRAN, CMS-2 and PL-1) and assembly. Heavy use of PDP-11.

SOFTWARE VERIFICATION AND VALIDATION..... Plan software test and integration procedures for complex realtime computer systems. Experience in inter-computer interfaces and configuration management desirable.

MICROPROCESSOR SOFTWARE..... Design and develop assembly language software for microprocessor and minicomputer-controlled realtime systems. Implementation of signal processing algorithms, input/output and interrupt handling and realtime executive functions.

Take advantage of these openings now, and enjoy western living at its best. You can expect an excellent salary, plenty of career challenge and growth opportunities, plus generous benefits including tuition reimbursement, medical, dental, and stock purchase plan.

For immediate consideration, forward your resume with salary history to GTE Sylvania, Attn: Dept. JR-728 P.O. Box 188, Mountain View, California 94042. We are an equal opportunity employer, minorities and females encouraged to apply. U.S. Citizenship required.

GTE SYLVANIA

The Great Technological Environment

We're the little company with the big ideas.

Opportunity abounds at Lexar. We're located in Brentwood, one of the most prestigious areas of Los Angeles. We're small enough so your talents can really be noticed, yet we're large enough to give you all the benefits those big impersonal companies do. And that's great. If you have big ideas, big talent, come and join a group of professionals who know how to enjoy their work in the digital telecommunications field. We have immediate openings for the following positions:

Systems Prog/Anal:
PL/M or ASM 86. 3 yrs. plus 16 Bit microprocessor exper. (Intel 8086)

Mgr. Prod. Assur:
Develop and coordinate staff to perform product assurance, both s/w and h/w configuration control. 3-5 yrs exper. B.S. Comp. S. or BSEE.

Product Assur. Spec:
Plan/perform quality assurance program. Verify test procedures for system delivery. 3-5 yrs exper. B.S. Comp. S. or BSEE.

For consideration, please call Personnel **(213) 820-9516** or send resume to:

LEXAR CORPORATION
11611 San Vicente Blvd., Brentwood, CA 90049

Equal Opportunity Employer M/F

TRW

COLORADO ELECTRONICS, INC.

TRW Colorado Electronics is located in the foothills of Pikes Peak in Colorado Springs, Colorado. Recreational opportunities abound to accent our 4 day workweek.

SENIOR COMPUTER SYSTEMS ENGINEER

To provide expertise to TRW/CE in the acquisition and use of computer-based management systems. Must be knowledgeable in the areas of both computer hardware and software and have a high-level of programming skills in several languages including FORTRAN and BASIC. BS in computer sciences or engineering with computer emphasis and have 5 to 8 years experience in the computer systems field.

Personnel Department, Room 163
TRW Colorado Electronics, Inc.
3650 North Nevada Avenue
Colorado Springs, Colorado 80907

An Equal Opportunity Employer M/F

Director

Management Information Systems

We are an intermediate-sized health care facility, located in Arizona, currently seeking a self starting individual to design and direct the ongoing development of our management information systems.

This position is directly responsible for the data processing operations and management information sections in our distributed processing environment.

The qualified candidate will possess a proven track record in the development of distributive data processing systems. 3-5 years of current systems engineering and programming background, as well as excellent interpersonal and communication skills necessary to interact with all levels of our staff.

We offer a career opportunity with upward mobility, an excellent salary and benefit package, in addition to an ideal Southwestern climate in an urban setting.

To apply, please send your resume including salary history to:

CW Box 2344
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

an equal opportunity employer m/f/h

SYSTEMS PROGRAMMER OPERATING SYSTEMS

IBM, VM, CMS or OS/VS experience, including installation and assembler coding. IBM 370/148 installed with 4341 and multiple 8100's on order to implement on SNA distributed environment. IBM 8100, VTAM/NCP, CICS/VS, VSAM, or health care experience a plus. Bachelors Degree in Computer Science plus appropriate experience or the equivalent combination of education and experience. Please send resume with salary history to:

University of Louisville
University Personnel Services
2223 South Brook St.
Louisville, KY 40292

An Equal Opportunity/ Affirmative Action Employer

ROBERT HALF

SOFTWARE SUPPORT
Major Dallas corporation needs IMS software technician for systems support. Willing to train candidate with three-plus years IMS applications experience seeking transition to more technical career. TO: $29,000.

PROGRAMMER/ANALYST
New COBOL financial system development. Mostly analysis for next year, then coding and testing. Two to four years IBM on-line experience required. TO: $25,000.

CONTACT: JOHN OCKELS
ROBERT HALF OF DALLAS, INC.
Two Northpark East, Suite 790
Dallas, Texas 75231 (214) 363-3300
World's Largest Personnel Consultants For EDP Professionals

COMPUTER OPERATOR

To operate NCR 8455 computer. NCR and CIF experience required. Salary commensurate with experience. If interested send resume to:

Patricia Foster
Personnel Director
State National Bank
6921 Arlington Rd.
Bethesda, MD 20014

PROGRAMMER ANALYST

Senior level career Programmer/Analyst positions available with The California State University and Colleges. Work on a variety of administrative systems in higher education. Minimum of three years COBOL experience and equivalent to graduation from college required. Cost free career development available. Mid-Wilshire location. Salary: $26,893-$32,450 annually. For more information, please contact **JOE MAH at (213) 852-5758**, or send resume to:

Personnel Services, Ref: SP

The California State University & Colleges

400 Golden Shore
Long Beach, CA 90802

Equal Opportunity Employer M/F

Compiler Development

Ongoing and imminent projects include optimizing and fast development compilers for FORTRAN, PASCAL, and ADA. Candidates should have a strong background in compiler construction from either industry or academic experience as well as proficiency in assembly language and FORTRAN or PASCAL.

Operating Systems-Data Communications

We need systems programmers who desire to advance themselves in a first line, state-of-the-art, O/S-data communications environment. Successful candidates will work on a number of interesting projects relating to development and maintenance of operating systems, support software, and data communications. Knowledge of assembly language, real time systems, drivers, debugging aides, editors, etc. desirable.

Software Quality Assurance

We have immediate opportunities for SQA professionals with 3 or more years experience in a dedicated SQA function that requires broad technical background and expertise. Successful candidates may also have extensive user oriented experience such as in software support services or may have software development or maintenance experience of 5 years or more and a desire to enter the demanding area of SQA. All applicants must be able to demonstrate proven skills in these areas plus good interpersonal skills to interface effectively with both technical and non-technical people.

Software Technical Writer

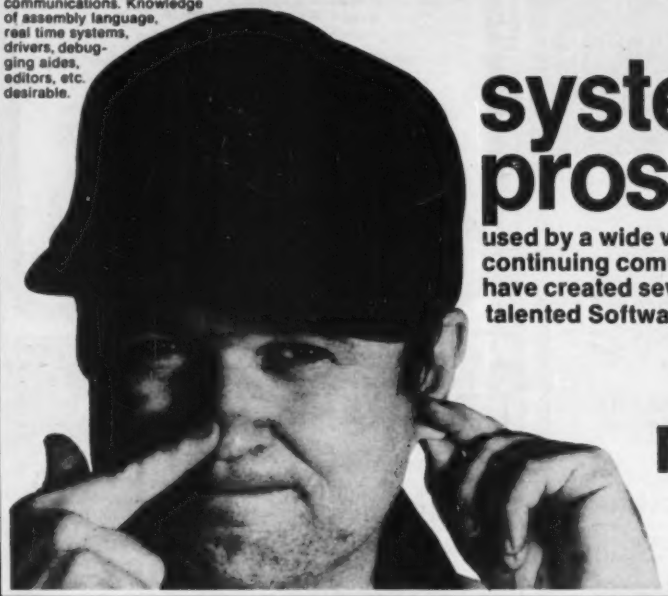
Successful candidates will be knowledgeable in the complete processing of manuals from inception through production. Position requires 2 years experience in software documentation. Research, write, edit programmer reference and user software manuals. Must be able to write from software specifications and to interface effectively with software development and publications personnel.

Knowledge of operating systems, programming languages, and/or data communications desired. Familiarity with software concepts and terminology is essential.

Perkin-Elmer's Computer Operations is located in residential Monmouth County, New Jersey. Our facilities are only minutes from some of the most beautiful beaches and inland waterways on the East Coast and just 1 hour from the cultural resources of New York City.

As a Fortune 500 high technology leader, Perkin-Elmer offers excellent salaries and comprehensive benefits including profits sharing, dental assistance, and tuition reimbursement. For immediate consideration, call collect: John Travers, (201) 747-7300, or send resume to: Perkin-Elmer, Computer Operations, 106 Apple Street, Tinton Falls, New Jersey 07724.

An equal opportunity employer m/f



systems software pros

Catch the signal of Perkin-Elmer's Computer Operations, a leading designer-manufacturer of state-of-the-art small and medium scale computers used by a wide variety of industries. Long term projects and our continuing commitment to developing innovative, reliable software have created several challenging career opportunities on our talented Software Development team.

PERKIN-ELMER

UCLA

An Affirmative Action Employer

Information Systems Opportunities

Exciting opportunities to participate in administrative systems development efforts in one of the top universities in the country. UCLA is committed to the development and implementation of on-line systems for Financial, Payroll, and Student Records processing utilizing modern technology. The Administrative Computing Center configuration includes IBM 3031 AP with MVS, CICS and TSO/SPF, and on-line Xerox 9700 Laser Printer, 3730's and over 100 distributed terminals throughout California. Immediate plans include migration to a VTAM, SNA and SDLC environment.

Cradled in the rolling green hills of California's Pacific slope, five miles inland from the ocean, with broad vistas, spacious quadrangles, and landscaped gardens that reflect the changing color of the seasons, UCLA is one of the most beautiful campuses in the nation.

Professional, friendly, and flexible work environment; salary highly competitive with three weeks vacation and excellent benefits package. Ample opportunities for continuing education.

Current openings include:

- Senior level programmer-analysts with expertise in COBOL, VSAM, and CICS
- EDP Auditor
- Data Base Administrator
- Systems Programmers - MVS and CICS
- Teleprocessing Specialists
- Computer Operations Supervisor

Please send resume with salary history to:

UCLA
Administrative Information Services
Attn: Patricia Breed
3334 Murphy Hall
405 Hilgard Avenue
Los Angeles, California 90024

RECESSION PROOF

FOX-MORRIS has been selected to recruit for prestige consulting firms in the Northern Virginia/Washington D.C. area. Our clients have a combination of both private industry and government business that insures growth and security. High visibility, excellent advancement prospects. Salaries $25-40,000

MANAGEMENT CONSULTANTS

Big 8 consulting firm seeks Sr. Analyst or Project Leader with strong financial, acont systems experience. B.A. or Masters degree required. Private industry or consulting experience desired.

SOFTWARE PROJECT MANAGER

Responsible for IBM software quality assurance, product distribution, and customer support. Will supervise software acceptance testing groups. Prior management experience a plus.

PERFORMANCE ANALYST

Expension has added several new openings on a high powered team of Performance Evaluation Specialists. Unique oppty to join a leader in this field. Large IBM facility, modern benefits.

PROJECT MANAGER

Excellent oppty for management level analyst with extensive business systems background for large scale design and development projects. IBM hardware, software.

Our clients assume all fees and employment expenses. For more information, contact David Miller 703/790-1335.

FOX-MORRIS
Personnel Consultants
1710 Goodridge Dr.
McLean, VA 22102
EDP SPECIALISTS

OS/MVS ST. LOUIS

Special needs for applications people at two blue-chip St. Louis financial institutions currently include:

Project Leader, CICS, IMS — $25,500
Senior IMS Applications Tech — $25,500
Senior P/A, CICS, IMS — $23,500
The following have a 8.5% annual bonus:
Equipment Analyst — $18,000+
Sr. Analyst, Financial, IMS — $22,000+
Project Leader, Banking — $24,000+

All interview, relocation, agency fees paid by employer. Outstanding benefits at both client companies. Contact:

OBJECT Associates, Inc.
Employment Service
1401 S. Brentwood, Suite 307
St. Louis, MO 63144
(314) 962-3100

PROMOTE YOURSELF

HOUSTON OPPORTUNITIES

(Relaxed Living and No Recession In 30 Years)

Small Sample of Current Openings (400+)

IBM SYSTEMS PROGRAMMERS (MVS/JES or VM/370 or DOS/CMS)	To $35,000
COBOL PROGRAMMER/ANALYST (BS/BA, 3-5 years Financial Appl)	To $26,500
SENIOR SYSTEMS ANALYSTS (BS/BS, 5+ years Financial/Oil & Gas)	To $30,000
PROJECT LEADERS (BS/BA, Technical & Supervisory experience)	To $33,000
PROGRAMMERS/DATA BASE (BS/BA, 2+ years IMS or IDMS or ADABAS)	To $27,000
DATA BASE DESIGNERS (BS/BA, DB Design IMS or IDMS)	To $34,000
PL/1 PROGRAMMERS/ANALYSTS (BS/BA, 3-5 years Financial/Oil & Gas)	To $26,500
PROCEDURES ANALYST (BS/BA, Good Technical background)	To $28,600
TECHNICAL WRITERS (BS/BA, IBM experience preferred)	To $26,800

All Fees Assumed By Client Companies

Full Interview And Relocation Expenses Paid By Client Companies

ADDINGTON & ASSOCIATES
PERSONNEL SERVICES, INC.
6371 Richmond Ave.,
Houston, Texas 77057
(713) 780-6610

position announcements | position announcements | position announcements | position announcements | position announcements

Anyone can find jobs in data processing. But, the really good positions are hard-to-find.

Robert Half offices have specialized in finding the best edp positions for more than 30 years ...since it all began.

We have 70 conveniently located Robert Half offices in the United States, Canada and Great Britain. Look us up in the White Pages.

ROBERT HALF℠
data processing and financial personnel specialists

ALBUQUERQUE • ALLENTOWN • ATLANTA • BALTIMORE • BIRMINGHAM • BLOOMINGTON (MN) • BOSTON • BUFFALO • CHICAGO • CINCINNATI • CITY OF COMMERCE (CA) • CLAYTON • CLEVELAND • CLIFTON (NJ) • COLUMBUS • DALLAS • DAVENPORT • DAYTON • DENVER • DES MOINES • DETROIT • FORT WORTH • FRESNO • GRAND RAPIDS • GREENSBORO • HARTFORD • HAYWARD • HOUSTON • INDIANAPOLIS • JACKSONVILLE • KANSAS CITY • LEXINGTON • LONG ISLAND • LOS ANGELES • LOUISVILLE • MEMPHIS • MIAMI • MILWAUKEE • MINNEAPOLIS • NEW ORLEANS • NEW YORK • OMAHA • ORANGE (CA) • PALO ALTO • PHILADELPHIA • PHOENIX • PITTSBURGH • PORTLAND • PROVIDENCE • SACRAMENTO • ST LOUIS • ST PAUL • SALT LAKE CITY • SAN ANTONIO • SAN FRANCISCO • SAN JOSE • SCHAUMBURG (IL) • SEATTLE • STAMFORD (CT) • TAMPA • WALNUT CREEK (CA) • WASHINGTON, D.C. • WILMINGTON • CANADA: CALGARY • TORONTO • VANCOUVER • GREAT BRITAIN: BIRMINGHAM • LONDON

© 1980 R-H International, Inc.

SYSTEMS PROGRAMMERS

Lederle Laboratories, the pharmaceutical division of American Cyanamid, is expanding its distributed data processing network, DEC System-10 KL1099D, Satellite PDP-11 and VAX computer nodes to provide greater support to medical research operations. Systems programmers who can effectively contribute their expertise to this on-going effort will enjoy long-range career growth. These positions require experience in one or more of the following systems:

- **TOPS-10 Version 7.00 SMP**
- **RSX-11M Version 3.2**
- **DECNET-11M or DECNET-10**
- **VAX/VMS Version 1.6**

Location: Rockland County — only 30 miles northwest of N.Y.C. — easily accessible from the N.Y. Thruway, Garden State Parkway and Palisades Parkway. These growth opportunities offer competitive salaries and outstanding benefits. Please send resume with salary history/requirements to **Mrs. Nancy Levine, Professional Employment Coordinator,**

Lederle

Lederle Laboratories
American Cyanamid Company
Pearl River, N.Y. 10965
An equal opportunity employer, male/female

SYSTEMS PROGRAMMERS

Match your capabilities to our major EDP environment . . . and speed your career growth

New and interesting challenges with opportunity for outstanding accomplishment now await you in our exemplary, state-of-the-art environment:

370/158 attached processor running MVS/SE operating system using IDMS database, TCAM and JES2 RJE data communications, TSO with SPF.

Implementing VM SEPP system to run MVS and CMS users.

Positions in our Morris County Headquarters facility are immediately available to work in software support group on technical management of data center. Involves planning, installation, and support of operating systems and program products. Responsibility for problem diagnosis and resolution. Technical interface with users, programmers and software vendors.

These positions require solid background in BAL, JCL, systems support utilities, either TSO or CMS and one of the following:

- OS operating systems, sysgen, and SMP
- VM operating systems, sysgen, maintenance to CP and CMS
- database software, data dictionary standards, options for performance, journaling, recovery

We offer excellent starting salaries. Complete benefits including tuition aid. Latitude for progressive ideas and innovations that will enhance your professional status and personal satisfaction.

For immediate consideration, in confidence, forward resume with salary history and current requirement, or call: Joan Weiser (212) 751-5000, ext. 3131 or (201) 884-0500, ext. 3131.

NABISCO, INC.

East Hanover, New Jersey 07963
An affirmative action equal opportunity employer M/F

Computer Scientist

Advanced Operating System Development

National Semiconductor is developing software for its next generation microprocessor system and is in need of a top computer scientist to develop state-of-the-art virtual-memory software.

You must have a BS in computer science with experience in operating systems or be a top MS candidate with extensive coursework in OS.

If you fit the bill, you will become a member of a small, dynamic team creating the wave of the future in small systems. For consideration, send your resume in complete confidence to **Nancy McAuliffe, National Semiconductor, MS-16255, 2900 Semiconductor Drive, Santa Clara, CA 95051; or call her COLLECT at (408) 737-5640.** An affirmative action employer.

National Semiconductor

If you didn't know that, you don't know National.

PROGRAMMERS
P.O.S. / SCAN APPLICATIONS
SYSTEM SOFTWARE PROGRAMMERS

Experienced D.P. Professionals Needed for Planned Expansion.

Current Environment:
IBM System 370-OS/VS1
VM/CMS CICS IMS
PL1 COBOL MKIV

Rapidly expanding Data Processing Dept. offers excellent growth potential, excellent salary & benefit package. Send resume & salary history or call:

ASSOCIATED WHOLESALE GROCERS
5000 Kansas Avenue
Kansas City, Kansas
913-321-1313 Ext. 314

★★★

SYSTEMS PROGRAMMER

Firm background in DOS/VS and working knowledge of IBM Assembler required. Knowledge of CICS/VS, DMS and DL/I a plus. Competitive salary and excellent fringe benefits. Apply personnel office: Florida Institute of Technology, Melbourne, FL

An Equal Opportunity Employer

programmer

We are a leader in one of the fastest growing industries — telecommunications — and are currently looking for a talented Programmer who wants to assure his/her own success by making a real contribution to ours. We prefer you have:

- **Understanding of MICRO/MINI Assembly language**
- **1-3 years related experience**
- **Familiarity with Rockwell 6500 and DEC RSX 11M a plus.**

We offer an excellent compensation package commensurate with background and experience plus realistic potential for professional growth and development.

For immediate, confidential consideration, call collect Mr. R. Sadowy, Chief Engineer, at (212) 392-4800 Ext. 176. Or, send your resume including salary history & requirements to: Mr. R. Sadowy, Executone Inc., 29-10 Thomson Ave., Long Island City, NY 11101.

Executone inc.

A Member of Continental Telephone System
Where energy and experience interconnect
An Equal Opportunity Employer m/f

COMPUTER EXECUTIVES WHY CHANGE NOW?

Autonomy — lack of?
Inflation?
Recession?
Politics?
Opportunity seeking?
Re-organized?
TRIP would do you good?

1980: A Year of Dramatic Growth
San Francisco Opportunities

Manager MIS	To $48,000
Telecommunications Manager	To $45,000
Manufacturing Systems Manager	To $42,000
Manager of Applications	To $40,000
Software Manager	To $40,000
CICS Analyst	To $36,000
Senior Systems Analyst	To $30,000
Programmers (many)	To $30,000

State-Of-The-Art
Search and Placement

(415) 421-1142

Thomas Beck Inc.

Suite 3033
595 Market Street
San Francisco, California 94105

Executive Search for the DP Industry
Client Companies Assume All Fees

MANAGER TECHNICAL SUPPORT

Build Your Future With Shopsmith!

At Shopsmith your future is secure as you join a dynamic team of experts responsible for keeping track of fast and accurate information. As one of the top 100 fastest growing companies in the country we can offer you a future of continuous professional growth, as well as an attractive salary and benefit package

You will be responsible for all functions related to systems support, data base, data communications and all hardware and software in an IBM hardware environment. You will be leading the team responsible for installing an IBM 4331 and 4341, by September, 1980.

Long range responsibilities will include:

- integration of word processing with data processing
- point of sales terminal networks
- conversions of DOS/VSE to OS/MVS

Experience utilizing IDMS- DB/DC, integrated data dictionary and on-line query required. Programming languages; COBAL and BAL operating systems: DOS/VSE and OS/MVS.

Talk to us about your future today. Send your resume in confidence to:

Employment Specialist

Shopsmith Inc.
"THE WOODWORKING COMPANY"
750 Center Drive, Vandalia, Ohio 45377

PROGRAMMER ANALYST SENIOR

Expanded Charlotte Data Center has on-line system in a multi-division organization providing excellent opportunity for advancement in a professional environment. We need strength in programming and design using modular system development.

JOB REQUIREMENTS:

- 5-7 years ANS COBOL programming
- 4 years hands-on system design
- user interface experience
- project team experience
- experience with UNIVAC 90/60-90/80 or IBM 370 OS
- job control languages
- degreed in computer science or related field

Attractive salary and benefits with a company that offers opportunity. Send salary and resume in confidence:

Rexham
CORPORATION
Manager, Corporate Recruiting & Development
P.O. Box 4068
Charlotte, North Carolina 28204
An Equal Opportunity Employer M/F/H/V

Data Processing Professionals:

The creative spirit is alive and well at UNI-COLL.

Kindred spirits are invited to join us!

Our innovative and dynamic computer utility is experiencing rapid growth. (It's no surprise!) We invite you to become part of our growth, and join our team of highly qualified professionals providing computer capabilities to a wide range of clients in a timesharing/remote job-entry environment.

Our growth has created the following openings (at our Philadelphia headquarters unless otherwise stated):

Systems Programmer—Interactive Systems. You'll be responsible for providing systems-level support for interactive and data communications software components (TSO, VTAM, TCAM, NCP/EP, CICS)...and you must have a thorough knowledge of Assembler Language, JCL, and utilities. *Knowledge of software gen's, PTF application, MVS structure, and CICS is desirable.*

Analyst/Programmer—Product Development. You'll be responsible for internal design, implementation, and testing of products developed by the group. This job requires proficiency in Assembler coding, and a detailed knowledge of data management techniques and interfaces. *PL/1 knowledge is highly desirable.*

Analyst/Programmer—Product Development. You'll be responsible for maintaining accounting, security support, and utility programs; determining enhancements to existing programs based upon users' requirements; and developing new programs as needed. *This job requires knowledge of Assembler Language and PL/1. Background in business/financial systems is important, and knowledge of COBOL is a plus.*

System Programmer & Trainee**—System Development.** The System Programmer will be responsible for providing systems programming support for our MVS/MP installation; for designing and developing changes/additions to the operating system software; for measuring and tuning system performance; and for recommending new hardware and software configurations to meet UNI-COLL's growing needs. *This job requires appropriate experience and maturity, plus a background in operating systems and Assembler Language.* A **Trainee** position is also available for someone with a programming background and a college degree or equivalent experience.

Technical Service Representative. You'll be responsible for performing liaison functions between UNI-COLL and our customers; providing marketing support to customers; and troubleshooting. *This job requires analytic abilities, well-developed communications skills, and familiarity with IBM utilities...as well as knowledge of at least 1 programming language. Knowledge of APL, TSO, or STAT packages is a plus.*

Sales Representatives (3). You'll be responsible for expanding our customer base and handling administration of existing accounts as required. *These positions require background in the data processing services industry—specifically timesharing sales; highly developed skills in communications; and the ability to interface with corporate top management. A profile of self-discipline and strong interpersonal skills is highly desired.* **Locations (one each) are Philadelphia, New York City, and Washington, D.C.**

Production Typist—Word Processor. You'll be responsible for the typing of general correspondence, proposals, documentation, forms, and related projects...on our Xerox 850 word processor. *This job requires good typing skills and experience in word processing or in data entry. We desire a highly motivated individual capable of producing timely, high-quality output. Familiarity with data processing terminology is a plus.*

Our established position and rapid growth provide for truly competitive salaries on each position level, and we keep current in providing comprehensive and meaningful benefits. Most important: we provide you with the opportunity to make a personal impact in a state-of-the-art environment.

- *To explore these excellent career opportunities, send your resume, with salary history, in complete confidence, to:* **Director of Personnel, UNI-COLL CORPORATION, 3401 Market St., Philadelphia, Pa. 19104.** *We're an equal opportunity employer.*

UNI-COLL CORPORATION

position announcements | position announcements | position announcements

Data Processing Professionals

There's No Career Like A N.Y.C. Career... At A.E.P.

There's no career like a career in New York City! And, there's no challenge like the challenge of a data processing career with a utility company that supplies over 7 million people with electric energy. That's exactly what American Electric Power does. And we'd like you to help. Right here...right now...in New York.

If you've been looking for this kind of challenge...and would like to find it in New York...check the job qualifications listed below.

RAMIS II Coordinator

You will interface with RAMIS II users and the vendor as well as with the Computer Systems Division for systems maintenance. You will also maintain required documentation and provide user education as required. To qualify, you should have 1-3 years RAMIS II user experience and good communication skills. Degree desirable.

Data Base Analyst

You will maintain Data Base Systems, interface with users and demonstrate a powerful new language called "NATURAL". Degree desirable plus 1-3 years ADABAS user experience required.

Salaries are in line with your education and experience. And our benefits package is generous. For immediate consideration, send us your resume and salary requirements to: Diana Mackey, Dept. CW-7/28, **American Electric Power Service Corporation, 2 Broadway, New York, New York 10004.**

AEP

AMERICAN ELECTRIC POWER SERVICE CORPORATION
2 Broadway, New York, New York 10004
An equal opportunity employer, m/f/h.

AEP—A Step Ahead!

SUNBELT EDP OPPORTUNITIES

CONSULTING **$35,000**
Well known Atlanta firm seeks individuals able to apply DP experience in solving diversified mgmt. problems. Requires dg. plus 3+ yrs. exp. in a "User Troubleshooting" environment. Excellent communication skills a must. Unlimited growth potential.

PROJECT LEADER **$29,000**
Atlanta corp. in large sophisticated IBM environment desires individual to play a significant leadership role in the implementation of large DB systems. High management visibility. Requires background in the completion of lg. financial systems within an IBM environment. DB systems knowledge a plus.

SENIOR SYSTEMS ANALYST **$28,000**
Major North Carolina manufacturer, due to continued growth and expansion of its systems dept. has created several opptys. for professional analyst. Successful candidate will hoved supervisory responsibilities for the design, analysis & maintenance of sophisticated on-line mfg., sales/mktng., or financial systems. Requires dg. plus past programming exp. and min. of 3 yrs. on-line system design & analysis bkgd. Latest IBM hardware and solid knowledge of COBOL a must. CICS, IPMS or IMS exp. a plus.

SENIOR PROGRAMMER ANALYST **$25,000**
Charlotte area Fortune 500 mfg./distribution client has immediate need for two (2) P/A's for involvement in a variety of General Business and Mfg. Systems. Opptys. requires min. 2 yrs. solid COBOL exp. preferably within sophisticated IBM shop. On-line background a plus.

PROGRAMMER ANALYST **$25,000**
Accelerated growth has created the need for additional DP professionals in the Atlanta computer organization. Oppty. affords ability to keep abreast of latest state-of-the-art technology. Requires 2+ yrs. COBOL exp. within an IBM environment.

SYSTEMS DEVELOPER **$23,000**
Leading Charlotte employer due to new projects demand has several opptys. available for professional analyst with solid Business Systems exp. preferably from within IBM/OS/COBOL enviornment. DOS experience will be considered. Highly professional shop.

All fees and expenses paid by client companies. For immediate consideration contact any specialist listed below.

FOX·morris
personnel consultants

Ron Spong
47 Perimeter Center East,
NE Suite 540
Atlanta, GA 30346
(404) 393-0023

Jim Schwab
Frank Carrese
1743 Southern National Center
Charlotte, NC 28202
(704) 375-0660

MEMBER NATIONAL PERSONNEL CONSULTANTS

STATE OF ARKANSAS
DEPARTMENT OF COMPUTER SERVICES

The Department of Computer Services is currently seeking qualified applications for the following positions:

Data Base Manager	To: $35,000
DP Technical Advisor	To: $35,000
Sr. Systems Planner	To: $30,082
Applications Development Administrator	To: $30,000
DP Systems Support Manager	To: $23,140
DP Sr. Project Leader	To: $20,000
Sr. Programmer Analyst	To: $17,836
Data Base Analyst	To: $16,926

Minimum qualifications for these positions are: BS in Computer Science, Math or related field; plus from 2 to 5 years extensive Data Processing and Management experience.

Located in the Sunbelt city of Little Rock, the Department of Computer Services is the largest DP facility in the State of Arkansas and utilizes IBM 370/AMDAHL-V5 equipment operating under VS1 with IMS, CMS and CICS technologies. We offer liberal fringe benefits and professional growth opportunities commensurate with abilities. Job related education and/or experience may be considered as substitution for minimum qualifications subject to approval.

Resumes should be sent to:

DCS Personnel Officer
Department of Computer Services
P.O. Box 3155,
Little Rock, Arkansas 72203

Equal Opportunity Employer M/F

Unusual assignments in KINSHASA, REPUBLIQUE DU ZAIRE

Manager
Data Processing Department

Manage & direct activities of DP Dept. including budgeting, pricing, setting rates for use of equipment (user account), planning for software, liaison with other depts. and management, and development of a training program.

Systems Engineer
Hardware

Position requires maintenance and service of minicomputer hardware, including buildup and control of parts inventory (HP 3000 II series desired.) Training provided in domestic location.

Both candidates should have some knowledge of, or willingness & ability to learn, written & spoken French. Assignment length: 2 years. Housing & local transportation provided; tuition reimbursement for children; no local income taxes.

For immediate interview, please call Sharon Flood at (415) 442-7396 or send resume to:

INTERNATIONAL ENGINEERING
A MORRISON KNUDSEN COMPANY
180 Howard Street • San Francisco, CA 94105
An equal opportunity employer

SYSTEMS & DATA PROCESSING MANAGER

A newly-formed ITT unit in Palm Coast, Florida, located near Daytona Beach, is currently seeking a key senior professional with a B.S. degree in Computer Sciences or related field. Position requires 6-8 years of IBM systems experience or equivalent. Knowledge of RPG II or COBOL languages a definite plus. Must be able to set up a data center function, have at least 2 years supervisory experience with emphasis on personnel management, budgets and procurement of necessary hardware/software. Some travel is required.

In addition to an excellent salary we offer outstanding benefits and paid relocation. To be considered for this career opportunity please send your resume including recent salary history, in confidence, to:

T.L. Bailey
ITT TRANSPORTATION DISTRIBUTION SERVICES
Palm Coast, Florida 32051

ITT

POSITION ANNOUNCEMENT
Available - September 1980

POSITION: Several part-time openings as Visiting Lecturer in Computer Science. A full-time position is also available (rank negotiable)

QUALIFICATIONS: M.S. in Computer Science or equivalent.

POSSIBLE COURSES: Introductory level courses, Minicomputers, Data Structures, Software Engineering, Networks, File Processing, Compilers, Microcomputers, Computer Logic Circuitry.

GENERAL INFORMATION: Framingham State is a 3000 student institution located less than 30 miles from Boston/Cambridge/Dec:/DG/Prime with strong industrial and internship contacts with neighboring computer industries. Computer science division is expanding its major program and planning to develop a graduate program. Facilities include Cyber 72, 73 and PDP 11/34 systems and a microcomputer laboratory.

APPLICATION: **Send resume to:**
Anita Goldner
Chairperson, Search Committee
Department of Computer Science
Framingham State College
Framingham, MA 01701

An Equal Opportunity/Affirmative Action Employer

NEW HOSPITAL IN JUBAIL, SAUDI ARABIA

Manager of Data Processing
College degree. Experienced in developing and implementing computer based information systems in hospital. Must have experience in project management or DP management.

Senior Systems Analyst.
Experience in design, development and implementation of computer based information systems. Hospital experience and college degree desirable.

U.S. based firm *Family status permitted*
Competitive salary *5 weeks vacation*

Contact M-Systems Associates, Inc.
1900 Emery St., Ste. 322
Atlanta, GA 30318

ROBERT HALF

SOUTHERN OPPORTUNITIES

PROJ/LDR benefits appl.	$32K
PROG-RPG-A/R, A/P marine	$30K
HDWR-CE, CDC equip.	$30K
PLAN-MGR-OS/ETSS-CICS	$35K
PROG-FORTRAN-BS-CHEMENG.	$30K
PROG-RPG II, sys 3/15D.	$21K
COMP-OP, sys 3/15 OCL-CCP.	$13K
S/A-COBOL-UNIVAC 1100/80.	$25K
PROG-370 banking OS.	$24K
P/A 370-RPG.	$22K

FEE PAID NO CONTRACT

ROBERT HALF OF LOUISIANA, INC.
135 St. Charles Avenue
New Orleans, Louisiana 70130
(504) 524-3773

ADVANCEMENT OPPORTUNITIES
(NATIONWIDE — CONFIDENTIAL — FEE PAID)
Hundreds of listings — ALL LEVELS — top companies, all sizes, all industries. Starting salaries $18,000 to $42,000. Companies pay fees and expenses

Senior System Analysts	Project Mgrs./Leaders
Programmer/Analysts	Data Base Administrators
Application Programmers	Mgrs. Systems/Programming
System Programmers	Mgrs. EDP Auditing
EDP Auditors	Mgrs. Technical Support
Hardware/Software Analysts	Mgrs. Data Processing/MIS
Mini/Micro Professionals	Mgrs. IBM System 3/34/38

For more details, send your resume, or call:
Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346-9400

position announcements | position announcements | position announcements

SAUDI ARABIA

Data Processing Opportunities

SYSOREX INTERNATIONAL, INC., a rapidly growing Systems Management Company, now developing innovative multi-technology systems in Saudi Arabia, seeks experienced Data Processing professionals for the following positions:

Applications Programmer

Min. 3 yrs. experience in applications programming on IBM TP systems. Fluency in COBOL and Assembler with CICS and 3270 terminal knowledge a must.

DP User Instructors

These positions involve training Arabic personnel in various uses of a computerized information system. Knowledge of management information systems coupled with instructor skills essential. Complete fluency in Arabic a must. Related degree required, with formal education in computer science a plus. Some travel throughout Saudi Arabia required.

SYSOREX offers excellent salaries commensurate with experience and a comprehensive benefits program which includes 30 days annual vacation with paid round trip transportation for employee and family to place of residence, 15 paid holidays, free furnished family housing and free education for children.

Please send resume (salary history required) to Harry T. Delk, Director of Personnel & Administration, SYSOREX INTERNATION, INC., 10590 N. Tantau Ave., Cupertino, CA 95014.

SYSOREX
Sysorex International Inc.

MIDLANTIC

Midlantic Banks Inc.
New Jersey's most progressive Bank Holding Company.

EDP AUDIT OFFICER
IBM 3031, OS/VS, CARS 3, COBOL, OS/JCL, CICS, minis, on-line processing

WEST ORANGE, NEW JERSEY
Suburban Location

ATTRACTIVE COMPENSATION
Excellent Benefits

Send resume, including salary history to: Lyn Ross, MIDLANTIC BANKS INC., 95 Old Short Hills Road, West Orange, N.J. 07052. We Are an Equal Opportunity Employer M/F.

ANALYST/ PROGRAMMER

New Systems Development

We are seeking a DP professional to participate in the implementation of in-house business systems on Data General equipment.

On-line COBOL programming expertise and mini-computer systems development experience required.

We offer an excellent salary and benefit package.

Send resume and salary history to:

Julie Farr
E/A/N Records
Los Angeles, CA 90069
213/655-8280

Software Engineering Opportunities for Computer Scientists & Engineers

Openings in Dallas and Lewisville, Texas

Join Texas Instruments in the heart of the Sunbelt. You could work in Dallas, TI's hometown, or just north of Dallas in Lewisville, a growing community of 30,000. Live better in Texas, where cost of living is below the average of major U.S. cities and where there is no state income tax.

Work with real-time software applications for mini/micro computer based systems and on distributed computer architectures and uni-processor systems.

Application areas include:
- Computer assisted photo interpretation
- Airborne FLIR tracking and fire control systems
- Ground and air launched missile tracking and guidance systems
- Air traffic control support systems
- Image processing
- Military and commercial communications navigation systems
- Computerized voice encoding/recognition
- Hardware architecture development support
- Advanced radar systems
- Real-time signal processing

Test Support Software Development
- Automatic test equipment
- Hardware diagnostics
- Automatic test generation
- Software unit test system

Systems Development and Operations Management
- Distributed computing system applications
- Operating system utilities: development and configuration management
- Resource utilization and management systems
- User consulting/system analysis/system engineering
- Engineering/management support systems
- Data communication applications

Languages
- Assembly
- FORTRAN
- PASCAL
- JOVIAL
- ATLAS (test support language)
- ADA
- Other higher order languages PL/I, BAL

All phases of software development
- Top-level software system definition
- Program design
- Code implementation and test
- System integration and test (factory and field)

Also special openings in the following areas:
- Software management
- Software configuration control
- Distributed data processing system/architecture design
- Software training: languages, design procedures, computer architectures
- Compiler development
- Functional analytic simulation

Applicants should have a BS, MS or PhD in Engineering, Computer Science or related field. Send your resume in confidence to: Ed Haynes/P.O. Box 401628, Dept. 238/Dallas, TX 75265. U.S. citizenship required.

TEXAS INSTRUMENTS
INCORPORATED
An equal opportunity employer M/F

Come share our commitment to electric utilities.

We're looking for a few good people who will thrive in a growing, innovative environment, where the challenges are never ending and the days are too short.

With the ever increasing complexity of utility company operation, the industry has turned to computer company based technology for help. We're Control Data's Energy Management System Division, leaders in technological innovation to service the electric utility industry... and we have positions open in the following areas:

*R&D Systems Programming *Marketing Support *Project Management
*Project Applications Programming *Application/System Engineering

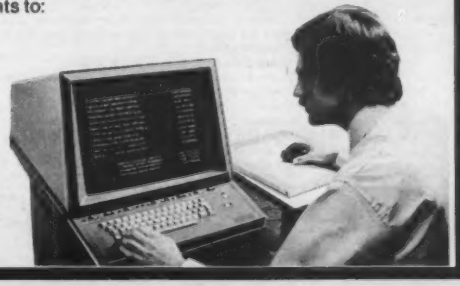
If you have at least 2 years experience in power systems software applications, process control, real time, assembler/fortran, data acquisition, or man/machine interfacing, you have just the experience we need.

You'll find Control Data not only has a reputation for innovation in the computer field, but also in employee services. We're located in an ideal suburban area offering a diversity and quality of life you'll thoroughly appreciate. Send your resume and salary requirements to:

Larry Dunbar
Control Data Corporation
2200 Berkshire Lane North
Minneapolis, Minnesota 55441
(612) 553-4299

CONTROL DATA CORPORATION
Addressing society's major unmet needs

An Affirmative Action Employer M/F



position announcements | position announcements | position announcements

Software Engineers

Play a key role in major developments serving tomorrow's telephony

ITT Advanced Technology Center has exceptional opportunities for Software professionals to support the task of developing ITT's 1240 switching system to the North American market.

We are seeking candidates for Staff and Supervisory positions to be involved with the definition, system design, and development of realtime software for a fully distributed control digital telephone switching system.

Positions are available in the areas of:

- **diagnostic/maintenance software**
- **telephony/call handling software**
- **administrative/data base software**

These openings require a strong computer science background—normally a MS degree in Computer Science or Electrical Engineering. Telephony experience is a plus.

Our location in a campus-like setting in famed Fairfield County offers exceptional opportunity for the good life. Housing to suit all tastes is available in locations free from urban pressures and pollution. Long Island Sound is nearby. Facilities for year-round recreation abound. Major cultural attractions are within easy reach.

And to make relocation easier, full ranging benefits in accordance with ATC policy include:
- a third party buying service or bridge loan
- paid mortgage points
- most costs associated with sale of residence
- most costs associated with purchase of new residence
- mortgage interest differential allowance
- one months new base salary settling-in allowance
- house hunting assistance by professional consultants

Please send resume, including salary history in full confidence to Jack Erle, Professional Recruiting Specialist.

ITT Advanced Technology Center

One Research Drive, Shelton, Conn. 06484.
An Equal Opportunity Employer, M/F

LEAD SYSTEMS ANALYST

Oxford Development Corp., a national real estate developer and property manager, seeks an experienced financial systems analyst with the following qualifications:
1) Minimum of 5 years data processing experience.
2) Minimum of 3 years experience in financially oriented computer systems (design through implementation).
3) Excellent verbal and written skills.
4) Excellent skills in COBOL (knowledge of DOS desirable.)

SALARY COMMENSURATE WITH DEMONSTRATED ABILITY, EXPERIENCE AND LEADERSHIP QUALITIES.
Salary Range: $22,000-28,000.

Send resume to:

Director of MIS
Oxford Development Corp.
3919 Meadow Drive
Indianapolis, Ind. 46205

An Equal Opportunity Employer, m/f.

Computer Science faculty member in an autonomous computer science program, with annually renewable contracts for a period of five years. Minimum requirements include either an M.S. in computer science with ability and interest in teaching some business-related computer courses, or an M.B.A. with current expertise in computer science; previous college teaching experience desirable. Position available August 1980 or January 1981. Academic rank and salary dependent upon qualifications. Elizabethtown College is a four-year, co-educational, liberal arts college with strong science, business and professional programs, enrollment of 1550, and located within easy access of major eastern metropolitan areas. Its primary computer facility is a medium-size DEC system-10 with 256 K words main memory, 5 disk drives, 32 ports (24-hour terminal access for faculty and students), and other peripherals. **Please direct letters of application, vita, list of references, and transcripts to Director of Personnel, Elizabethtown College, Elizabethtown, Pennsylvania 17022. Deadline for initial screening of applications is August 4.** An affirmative action/equal opportunity employer.

D.P. INSTRUCTOR

Large Conn. based fin'l. firm seeks solid comm. skills as teacher with a min. 1 yr. COBOL, JCL bkgd. in large-scale IBM environment. Outstanding oppty. in area's best training facility. Salary to $23,000. Contact Stan Durbas or Paul Meissner.

Robert Half of Hartford, Inc.
111 Pearl Street
Hartford, Conn. 06103
(203) 278-7170
Personnel Consultants

MONTANA OPPORTUNITY

Small Research Group has opening for a highly competent programmer/analyst. As the principal research & statistical agency in Montana state government, we are involved in computer graphics, social/economic analysis & modeling, geographic information systems, & satellite remote sensing projects.
Require degree in C.S., Math, Economics, or related field. Strong FORTRAN background required with MARK IV desired. IBM 370 MVS, Utilities, & TSO experience also helpful.

Apply:
R. THOMAS DUNDAS JR.
ADMINISTRATOR
RESEARCH & INFORMATION SYSTEMS DIVISION
MONTANA DEPT. OF COMMUNITY AFFAIRS
CAPITOL STATION
HELENA, MT. 59601
(406) 449-2606

INDEPENDENT COMPUTER PROFESSIONALS

Join the STARLEX team of free-lance consultants

• Maximize your income thru highly paid assignments • Enjoy an association with a proven marketing organization that can generate successive assignments • Life & Medical Insurance at group rate.

For further information call Maggie Liptak at 212-684-6540, or submit resume to: Interface Inc., 17 West 54 St., NY, NY 10019.

PROGRAMMER ANALYST II

Will develop and maintain program for administrative system. Will develop small scale administrative system and assist in development of large scale management information system. Will assist in project control, standard development and programmer training. Requires Bachelors Degree in Computer Science or a related field plus 2 years programming experience or equivalent combination of education and experience. Database, Structured Programming, On-Line communications, JCL and CMS experience is helpful. Salary range $15,504-$18,440 based on education and experience.

University of Louisville
University Personnel Services
2323 South Brook St.
Louisville, KY 40292
An Equal Opportunity/ Affirmative Action Employer

PROGRAMMER/ ANALYST

We are seeking a Programmer/Analyst with a degree in Computer Science or related area, and a minimum of 2 years programming experience or equivalent additional education. Position requirements include: substantial skill in program design, techniques, languages, coding and program testing and implementation to the solution of problems. Salary $13,440 — 19,380. Send resume to:

Melba Meek
MISSOURI STATE JOB SERVICE
505 Washington
St. Louis, MO 63101

An Equal Opportunity Employer

Data Processing Professionals

Opportunities in South San Francisco and Portland

GUY F. ATKINSON COMPANY, a leader in the construction industry, is rapidly expanding their data processing departments. If you seek challenge and growth, consider these positions:

Manager, Software Programming (South San Francisco)

Individual will direct planning, organizing and control of all systems activities. Qualified candidates will have excellent management skills and minimum 7 years' IBM systems programming experience.

Systems Software Programmers (Portland)

Responsible for designing, programming and maintaining software to permit continued growth of on-line database manufacturing systems. Minimum of 3 years' experience in V/M and DOS/VS required. Will spend approximately 6-9 months training at S.F. Data Processing Center with permanent assignment to Portland, Oregon.

Applications Programmer Analysts (South San Francisco)

Responsible for programming of on-line commercial systems. Should have a minimum of 2 years' experience in database and very strong in COBOL.

We offer excellent salaries and outstanding employee benefits. Send resume with salary history in confidence to: **Professional Employment Representative, GUY F. ATKINSON COMPANY, P.O. Box 593, South San Francisco, CA 94080.**

An equal opportunity employer
No Agency Calls

GF Atkinson co.

CHOOSE YOUR LOCATION!

Career opportunities available for qualified EDP Professionals with client companies in the following areas:

PARTIAL LIST ONLY

*Atlanta	*Dallas
*Houston	*Denver
*San Francisco	*Phoenix
*Ft. Lauderdale	*New Orleans
*Orlando	*Tampa
*Charlotte	*Long Beach
*Portland	*Miami

Companies provide challenge, opportunity for advancement, and "State-of-the-Art" motivations:

Need the following specialities: (Minimum of 1 year experience in IBM environment)

Programmer(s), Programmer/Analyst(s), Systems Analyst(s), Project Leader(s), Systems Programmer(s), Communications Programmer(s).

All fees, including interviewing and relocation expenses assumed by client companies.

Please send your resume in CONFIDENCE OR CALL ME TOLL FREE 1-800 821-2280 X804 (In MO, 1-800 892-7655 X804)

Bill Denny/Jim King
Jim King and Associates

1840 Gulf Life Tower/Jacksonville, Florida 32207
(904) 396-7371

LOCAL AREA COMPUTER NETWORKS

COMPUTER SCIENTISTS needed to develop technology and conduct experiments in local area computer networking. This work includes design, implementation and application of local computer networks; participation in voluntary standards technical committees and contract monitoring for the development of standards and supportive technology assessments and forecasts.

The candidate should have experience and training in many of the following areas: use, design, implementation or application of local area networks, familiarity with networking technologies, knowledge of contracting fundamentals, technical committee work and research in local network systems.

A B.S., M.S. or Ph.D. in computer science, engineering or a related field is desirable.

The position offers competitive salary at the GS-13/14 level, excellent career benefits and professional growth opportunities. Please send resume to:

U.S. Department of Commerce
NATIONAL BUREAU OF STANDARDS
Institute for Computer Sciences and Technology (CW)
Room B212, Technology (LAN)
Washington, D.C. 20234

NBS, a Federal Government agency, is located in modern facilities near Washington, D.C., and is an affirmative action and equal opportunity employer. U.S. Citizenship Required.

position announcements | position announcements | position announcements | position announcements | position announcements

Programmer — to 24K
Programmer/Analyst — to 27K
Software Analyst — to 27K
Sr. Programmer/Analyst to 29.5K
Supervising Programmer/Analyst to 32.5K
Supervising Software Analyst to 32.5 K

EBMUD, the West's second largest water utility, is expanding its Application and Technical Support staff to develop and implement District-wide on-line applications. The District also plans to develop applications utilizing a Data Base Management System.

Excellent opportunity for growth. State-of-the-art technology including IBM's 4341 rogressor with VM 370/CMS and OS VSI System Control Programs.

Stable career employment, full benefits. Contact immediately for more information and special application materials: Norma Hoshide (415) 835-3000 EXT. 270, 2127 Adeline St., Oakland, CA 94623

EAST BAY / MUNICIPAL UTILITY DISTRICT
P. O. BOX 24055 · OAKLAND, CA 94623 · (415) 835-3000
Equal opportunity for women and men of all races.

More Money.

. . . or Wonder of Wonders One: I wonder where I can find a better salary . . .

Ever wonder that yourself? Usually, a programmer working under contract with Allen Services Corporation will see a substantial raise in salary *immediately.* Not to mention *outstanding* benefits—a basic consideration of any salary "package". As well as a six-month review.
It's no wonder, then, that for the past eight years our field employees have been able to **stop** their wondering.
And we think that's just wonderful.

The Eight Wonders of the Contract Programming World:

- I wonder where I can find a better salary . . .
- I wonder who will give me better benefits . . .
- I wonder if I'll ever get to travel . . .
- I wonder if I'll ever be paid time and ½ for overtime . . .
- I wonder who will assist me if I decide to move . . .
- I wonder what company is willing to pay me for holidays . . .
- I wonder where I can get pride and satisfaction from my work . . .
- I wonder how to get in touch with Allen Services . . .

Toll-Free: 800-543-7583 (In Ohio: 513-890-1200)

ALLEN SERVICES CORPORATION
212 West National Road, Vandalia, OH 45377

Atlanta: 404-421-0051 · Chicago: 312-296-0446 · Dallas: 214-241-7025 · Detroit: 313-362-4500 · Hartford: 203-677-2522 · Houston: 713-447-0043 · Indianapolis: 317-848-1571 · Los Angeles: 213-553-1988 · Naples, Fla: 813-774-3077 · Pittsburgh: 412-921-7500 · Rochester: 716-271-7100 · Toledo: 419-865-8800 · Tulsa: 918-494-5010 · Wilmington: 302-453-1170

At Allen Services we care about our employees.
Equal Opportunity Employer

PROJECT MANAGER
ATLANTA

Rollins, Inc., a leader for years in the service industry, has an immediate opening in our Atlanta headquarters for a Senior Project Manager to lead a staff of 10-20 programmers and analysts in the design and implementation of on-line financial systems.

We are currently running an IBM 370/158 with IMS DB/DC and a conversion to MVS around the corner, plus two DEC 11/70's.

The person we seek will have:

* Strong knowledge of COBOL and big systems design in an on-line environment using IMS.
* Ability to lead 10-20 programmers and analysts in the design and implementation of financial systems.
* Administrative capabilities in handling special projects for manager of systems and programming.

We offer a rapidly growing data center with excellent career opportunities, good company benefits and competitive starting salaries. Send your resume with salary history to:

Jim Morgan
Employment Manager
ROLLINS, INC.
2170 Piedmont Road, N.E.
Atlanta, Georgia 30324

ROLLINS
FOR A SECURE ENVIRONMENT

An Equal Opportunity Employer M/F

REWARD
cable data
Field Engineers

We'll pay a $1,000 REWARD for helping us find the very best Field Engineers - even if you turn yourself in! Just join our winning team enjoy the reward.

We are the nation's leading computer billing firm for the Cable T.V. industry, and growing at over 35% per year. Our company is assuming all assembly, maintenance, and installation of our on-line mini computer systems throughout the U.S. if you have 3 - 5 years mini computer experience and can work on CDC disk drives, DataProducts line printers and data communications equipment, you may qualify for one of these excellent career opportunities located in:

- PHILADELPHIA
- INDIANAPOLIS
- DALLAS
- SACRAMENTO
- ATLANTA

If you're one of the best in your field, we can offer you career growth and an outstanding compensation and benefits package. If interested, call (916) 488-1642 (collect) or send your resume and salary history to CableData 3200 Arden Way, Sacramento, California, 95826.

SYSTEMS PROGRAMMER
**** WE ARE OFFERING AN EMPLOYMENT BONUS ****

Excellent growth opportunity to get involved in a major conversion. We currently are converting to DOS/VS under VM/370 on an IBM 138. Also implementing a 3600 and 3270 network using a VTAM/NCP based software package. A working knowledge of assembler and JCL under DOS/VS and SCP maintenance procedures is mandatory. Exposure to VM/370 and COBOL is helpful. We offer challenging opportunities, professional growth, competitive salary and benefits. **Contact the Staffing Manager at (312) 922-0900, ext 384 or send resume to:**

HOME FEDERAL OF CHICAGO
Personnel Dept.
201 S. State St.
Chicago, Il. 60604
EQUAL OPPORTUNITY EMPLOYER

UTAH STATE UNIVERSITY

The administrative section of the Computer Center at USU has one position open for either a Programmer or a Programmer/Analyst. Either position will include developing and programming administrative systems using a Burroughs 6800 and/or a PDP 11/70. QUALIFICATIONS for Programmer: Knowledge of COBOL, BS degree or experience. Salary range: $13,000 to $17,000 per year. QUALIFICATIONS for Programmer/Analyst: Knowledge of COBOL, BS degree and 2 years experience. Salary range: $15,000 to $20,000 per year. We offer an excellent benefits package. Send resume, three references and salary history by August 15, 1980 to: Floyd J. Burnett, Computer Services, UMC 37, Utah State University, Logan, Utah 84322.

An affirmative action/ equal opportunity employer.

VALCOMP
Valley Computer Systems Inc.
3572 North 27th Ave.
Phoenix, AZ 85017

Valcomp is a rapidly expanding Phoenix corporation with national sales and services. We have an immediate opening for a Systems Manager for our dual DEC 11/70's under RSTS/E with future expansion to the VAX equipment. If you're career oriented, want excellent working conditions, benefits and a competitive salary send resume or call in confidence to Bill Boyle, Phoenix, 602/266-2346.

PHILADELPHIA
MIS MGR
to $26,000

Systems-oriented pro w/solid MFG bkgd sought by NE PA FORTUNE 500 div. TAKE CHARGE of DP function, incl sftwre, budget, development for 10 person 370 shop. HIGH VISIBILITY SPOT w/TOP FRINGES. (ALWAYS FEE PAID)

CONTACT: Dennis McCauley

ROBERT HALF
OF PHILADELPHIA, INC.
2000 Market St., Suite 706
Philadelphia, PA 19103
(215) 568-4580

DATABASE OPPORTUNITIES

A major urban university preparing to create on-line DB environment. Administrative applications are converting from DEC-10 and IBM DOS environment to IBM 370/4300 environment. Database specialists needed to develop and maintain new environment, provide for conversion and maintain operational support for both environments during transition. Positions are now available for Programmer/Analyst III and Programmer III levels. Excellent benefits including liberal vacation and 6 credit hours per semester at the university. Please send resume with salary history to:

University of Louisville
University Personnel Services
2323 South Brook St.
Louisville, KY 40292

An Equal Opportunity/ Affirmative Action Employer

PROGRAMMER/ SUPERVISOR

Beautiful, smog-free, small city in Oregon wants you. Applied Theory Associates has an immediate opening for a Programmer/ Supervisor with experience on HP 250/3000 computer; knowledge of BASIC and Image Database a necessity. Responsible for developing and designing on-line business applications, training of junior level programmers and non-technical personnel. Technical writing a plus. This is your opportunity to join a young, growing company with profit sharing, employee stock option plan and many other benefits. Salary commensurate with experience. Send resume to: **Francine Counihan, Applied Theory Associates, 180 N.W. Lewisburg Rd., Corvallis, Oregon 97330, 503/757-1181**

position announcements | position announcements | position announcements

Software Engineering Professionals

Continue your personal and professional growth and take advantage of educational opportunities at National. You'll work with a highly skilled development team in the design of an advanced microcomputer system based on our next generation microprocessor family. If you're a management level systems software engineer, consider the following opportunities:

Manager-Software Validation

You will be responsible for forming and leading the design team in validating our advanced systems software. Requires knowledge of Pascal or equivalent language, previous software leadership and design experience plus a BS in computer science. An advanced degree and knowledge of hardware diagnostics is desired.

Technical Project Leader

You will be responsible for the implementation of an advanced Pascal based compiler. A MS in computer science is preferred along with 3 or more years' experience.

Please send your resume in complete confidence to **Nancy McAuliffe, National Semiconductor, MS-16255, 2900 Semiconductor Drive, Santa Clara, CA 95051; or call her COLLECT at (408) 737-5640.** An affirmative action employer.

National Semiconductor

If you didn't know that, you don't know National.

Data Communications Project Managers

Norwalk, Connecticut

Our rapid growth has created several highly visible positions at our Connecticut headquarters. If you have experience in the following area, you will be interested in the future we have to offer you at TRT Data Products.

To meet our growing technical requirements and sales successes, we need "hands on" Project Managers, well-versed in data communications, software programming (real time-assemblers). They will have heavy involvement in specification development, debugging test/acceptance proceedings and software design, and assist in the definition of hardware requirements. Applicants should have broad mini-micro experience, must be able to act in a customer interface role, and be flexible enough to thrive in a fast paced challenging environment.

Headquartered in Connecticut, we are a subsidiary of a Fortune 100 company. We offer an excellent salary and benefit package. If you are interested in having a direct impact on the success of our high technology oriented company and wish to arrange an interview, please send your resume (including salary history) to: W. Comerford, TRT Data Products, Inc. Suite 200, 1747 Pennsylvania Avenue, N.W., Washington, D.C. 20006 or call (202) 862-4540. All replies will be held in strict confidence. An equal opportunity employer M/F.

TRT Data Products, Inc.

EDP OPPORTUNITIES

NEW YORK CITY

PROJ Ldr Sav-DDA-Install. $33K
P/S MGR DEC 20 COBOL
Fortran BASIC fincl . . . . . $37K+
INTL Banking Mgr CHIPS, SWIFT, FEDWIRE. . . . . $38K+
ON LINE SYSTEMS CICS staff 25 . . . . . $38K+
REGIONAL Mgr SERIES 1 banking syst G/L, Money market foreign ex . . . $40K
SOFTWARE Advance technol OS BAL TCAM $36K
CONSULTANT Sr ANA TANDEM $36K
OPERATIONS MGR 370/OS MVS CICS. $45K
SYST Anal-Intl CICS corp JET track trademark finance system . . . . . $35K+

NEW JERSEY

SYSTEMS Anal CICS COBOL. $29K
FINANCIAL Systems CICS MBA $32K
SYSTEMS Anal CICS DL1 . . . . . $32K
SYSTEMS Engr microprocessor SSEE PDP 11 VAX $35K
PROJ Ldr CICS DOS VS inventory. $33K
PROJ Ldr Software spec CICS $33K
SOFTWARE IMS DOS Gen $33K

CONNECTICUT WESTCHESTER

PROJ Ldr fincl systems
VM VS1 Total CICS $31K
PROJ Ldr Commodities fincl total cics $32K
GROUP Ldr software develop microprocess $35K
SOFTWARE Anal OS VS MVS $29K
SCI Prog INTEL ALP Fortran $33K

Call Bill Borrelli
(212) 349-3610
WILLIAM HARRIS ASSOC
150 Broadway, agency
New York NY 10038

BEAT THE GAS CRUNCH

Live in beautiful uncrowded south eastern Idaho; minutes from work. Progressive data processing environment. Teleprocessing responsibility for several regional truck lines. Salaries competitive with metropolitan areas. Outdoor recreational opportunities close by.

Teleprocessing Programmers

Desire approximately 2 years experience CICS/ALC. These people will design/code conversational teleprocessing programs. Direct access data management experience helpful.

An Equal Opportunity Employer
Forward resume to:
Norm Schiffman
Garrett Freight Lines
P.O. Box 4048
Pocatello, ID 83201

OPERATIONS MANAGER
Fortune 50 — South Florida

Explore a career growth opportunity with excellent potential for upward mobility with a Division of a major International Corporation.

Requires:

1. Minimum of a B.S. Degree
2. 2+ years Operations Management experience in a State of the Art Environment
3. Prefers additional experience in Systems to enhance career growth opportunities.
4. Must have extensive planning and evaluation background of new hardware, software and telecommunications services
5. Must be a good communicator with a conservative appearance and executive presence.

To set up a confidential exploratory interview

Call — Ken Levinson (305) 757-8000 from 9 A.M. to 4:30 P.M. or (305) 949-8142 from 6 P.M. to midnight.

A classified section is known by the companies it keeps.

COMPUTERWORLD

INSURANCE

DATA PROCESSING PROFESSIONALS

Computer Horizons Corp. is one of the nation's leading data processing services companies. Through a network of 6 Regional Headquarters, we are providing fast and efficient technical services to a large, national and local clientele. We are currently expanding our National Insurance Group. We seek experienced D.P. professionals from the programmer analyst through the project manager level, who have insurance experience. The personal skills necessary to communicate effectively with our clients' management is necessary.

Special attention will be given to those professionals who either live in or desire a relocation to the Northeastern United States, having specific experience in one of the following: Life, Property and Casualty; Health; Pension and General Insurance area. In this region, there are high level and staff positions available.

If selected, and depending upon the level of your experience, you will play a key role developing, leading and/or implementing major insurance systems and software. In addition to above average salaries, company-paid relocation assistance and a full benefits package, you will be provided with a professional working environment necessary for you to attain your career objectives.

Possible relocation opportunities exist to other CHC locations: New York, New Jersey, Chicago, North Carolina, Atlanta, Miami, Houston, Dallas, Tulsa, and San Francisco.

To apply, or for further information respond to:

David Reingold
National Recruiting Director
COMPUTER HORIZONS CORP.

747 Third Avenue
New York, New York 10017

An Equal Opportunity Employer m/f

Eastern Marketing Representative

For Program Product Sales to IBM OS/VS Installation

We are an 11 year old growth oriented San Francisco based software product and computer services firm with annual sales in the ten to twenty million dollar range.

We are seeking a self-starting, independent person to establish an office for us serving the Eastern Seaboard. The person we seek must have a technical knowledge of the IBM OS environment and at least one year's sales experience.

Earnings expectations are $50,000 per annum and up. All the usual benefits plus a few specials. You'll find that we are conservative fiscally, free intellectually, and offer significant opportunities for advancement.

If you are interested please address

CW Box 2345
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

An equal opportunity employer by choice.

UNIVERSITY OF PETROLEUM & MINERALS
DHAHRAN, SAUDI ARABIA
COMPUTER SCIENCE DEPARTMENT

The Department of Systems Engineering will have faculty positions in Computer Science open for the academic year 1981-82, starting 1 September 1981:

Academic Qualifications and Experience:

PHD in Computer Science or in a closely related discipline with emphasis in programming languages, Data Base-Organization and Structure, Microprocessors, Operating Systems, Data Processing, System Analysis, Digital Design, Computer Architecture, and Software Engineering.

Language of instruction is English.

Minimum regular contract for two years, renewable. Competitive salaries and allowances. Air conditioned and furnished housing provided. Free air transportation to and from Dhahran each year. Attractive educational assistance grants for school-age dependent children. All earned income without Saudi taxes. Ten months duty each year with two months vacation with salary. There is also possibility of selection for university's ongoing summer program with good additional compensation.

Apply with complete resume on academic, professional and personal data, list of references, publications and research details, and with copies of transcripts and degrees, including home and office addresses and telephone numbers to:

University of Petroleum & Minerals
Houston Office
2223 West Loop South, Suite 410
Houston, Texas 77027

position announcements

CALIFORNIA

If you are interested in relocating to CALIFORNIA, call the West Coast's largest firm devoted exclusively to employment services for the Computer Professional. Our staff is composed of former DP Managers and Software Specialists, well-equipped to understand your special needs.

You may call us collect.

SR. PROGRAMMERS AND ANALYSTS to $34K

Participation in the development of IMS DC manufacturing systems. Large 3033 MVS installation located near the ocean. Full interviewing and relocation expenses paid for IMS hands-on; requires 4 years overall DP experience. Any costing or scheduling background is very helpful. Great relocation opportunity.

COMPUTER CAREERS INC AGENCY
280 Atlantic Avenue
Long Beach, CA 90802
(213) 437-2881

FACULTY POSITIONS COMPUTER SCIENCE UNIVERSITY OF MIAMI

Computer Science Ph. D. required; responsibilities to include research, teaching, undergraduate and graduate program development. Specialties of interest include information systems design, data base, compiler theory, operating systems, software methodology and applications. Competitive salary. Send resumes to:

John Dumas, Director
Computer Studies
University of Miami
P.O. Box 248236
Coral Gables, Florida 33124
(305) 284-3948

A SYSTEMS ANALYST I position is available in the Programming and Analysis section of the User Services group of West Virginia Network for Educational Telecomputing. Responsibilities include providing user support for batch and timesharing computing on an Amdahl 470 V/7A and other large scale systems at the host site and for minicomputer systems at remote sites. Requirements: Technical competence at the bachelors degree level in a scientific or business field, 3 years work experience in programming or analysis on a large scale machine, demonstrated proficiency in 1 higher level language, and good oral and written communication skills. Salary open. **Apply by August 15, 1980 to Judy Martin, WVNET, 837 Chestnut Ridge Road, Morgantown, WV 26505.**

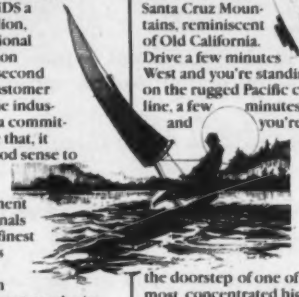
An Equal Opportunity/ Affirmative Action Employer

There's a good reason for building our Advanced Development Center in a town like Los Gatos.

You.

The MDS Advanced Development Center was built in Los Gatos, California for some very good reasons. Our people.

Since the Center's function — its *only* function — is to develop hardware and software for highly advanced distributed processing systems, it plays a vital role in making MDS a $200 million, multi-national corporation with the second largest customer base in the industry. With a commitment like that, it makes good sense to provide our development professionals with the finest resources available, in an environment conducive to freedom, creativity and unrestricted growth.



So, while we're just a few miles away from the high technology of Santa Clara's "Silicon Valley," you won't find our Advanced Development Center amidst a busy, distracting manufacturing plant or caught up in the hot competition of marketing and sales. Instead, you'll find a team of top development pros, living and working in a small, cozy town nestled at the foot of the Santa Cruz Mountains, reminiscent of Old California. Drive a few minutes West and you're standing on the rugged Pacific coastline, a few minutes East and you're on the doorstep of one of the most concentrated high technology areas in the world.

If you're a software development professional, you'll want to explore an opportunity to join us as we assemble a select team of software specialists to develop systems software for MDS' next generation product line — an advanced, microprocessor-based distributed processing, multi-user system. Investigate excellent opportunities for Systems Programmers and all Software Development Professionals in the areas of **Systems Architecture, O/S Development, Data Base Design, Communications, Design Verification** and **Product Planning.**

Call or send your resume, with salary history, to Carole Clark, Professional Employment, **Mohawk Data Sciences Corp.,** Advanced Development Center, 102 Cooper Court, Los Gatos, CA 95030; (408) 395-2160. We are an equal opportunity employer m/f/h.

MDS MOHAWK DATA SCIENCES

University of Riyadh Computer Center

Riyadh University requires the following DP professionals to support 3033N/MVS/JES2/TSO/VTAM/ACF

MVS Systems Programmers:

Minimum 3 years MVS/TSO experience in SYSGEN, PUT, SU's installation and debugging. Must be very knowledgeable in MVS internal's JES2 MVS performance, VSAM, IPO and MVS related program products and productivity aids. Must have good command of ALC. Knowledge of ACF/VTAM would be an asset.

Network Control Supervisors:

Minimum 5 years experience in DC hardware installation, troubleshooting network planning etc. Must be very knowledgeable in 3705, 3270 family and related hardware. In depth familarity with SDLC, SNA and BSC protocols, VTAM/ACF background would be an asset.

Excellent salaries and fringe benefits.

Please forward a copy of a recent resume to:

Director, Computer Center
c/o Saudi Arabian Educational Mission
99 Bank Street, Suite 1144
Ottawa, Ontario
K1P 6B9.

Sacramento, CA
PRINCIPAL PROGRAMMER ANALYST
$24,000 - $32,300

If you want affordable housing and easy access to recreational areas, relocate to the City of Sacramento and be a Principal Programmer Analyst managing the systems and programming section of the Data Processing Department. Supervise eleven programmer analysts using on-line program development techniques to maintain twenty-five major systems and develop new applications in accordance with an information master plan.

Requires degree in Computer Science or related field and 4 yrs. experience in EDP including 2 yrs. at a supervisory level and 2 yrs. in systems analysis and programming. Additional experience may be substituted for education.

Excellent fringe benefits. City of Sacramento application and resume must be received by August 22, 1980.

Request application from:
Sacramento City Personnel
801-9th Street Room 101
Sacramento, CA 95814
Tel. (916) 449-5729
EOE

OREGON INSTITUTE OF TECHNOLOGY
COMPUTER CENTER DIRECTOR

The Director is responsible for all aspects of academic and administrative computing and supervises a staff of six plus part-time student employees. BS, MS preferred, in Computer Science or related area. Experience in computer facility management and knowledge of administrative and scientific engineering applications required. Send resume by August 15, 1980 to:

John H. Smith
Assistant to the President
Oregon Institute of Technology
Oretech Branch Post Office
Klamath Falls, OR 97601
(503) 882-6321, ext. 282

Oregon Institute of Technology is an Affirmative Action/Equal Employment Opportunity Employer.

SAN FRANCISCO

CALLING . . . PROGRAMMERS

We have over 1,000 listings for programmers in the Bay Area. All interview/relocation expenses paid. Call collect or send resume for prompt evaluation of your skills vis a vis the current marketplace.

COBOL Industry leaders in Finance, Manufacturing, Insurance and Distribution are hard pressed to find people for their new development projects. Environments include IBM, Burroughs, Univac and Mini's. Data base, communications, state of art hardware and software. Minimum one year experience needed.

RPG II Clients are/have ordered their 38's and some need help converting to 34's and 4331's. CCP, Manufacturing and/or Financial applications in small and large DP environments. 90/30's need your skills as well-diverse applications.

PL/1 Several openings for strong applications and systems people in large IBM environments. Call collect to review opportunities.

SYSTEMS The call for competent systems programmers has increased dramatically in the last few months. Assembler, Gens, VM internels background needed with potentials to management if this is your want.

The list goes on and on . . . We have the state of art Clients with all the current acronyms in the industry. We need YOU to take advantage of the current shortage of qualified professionals. Team/Project Leaders, Systems Analysts, DBA's, Fortran, ALC, . . . you name it, we undoubtedly have it.

ROBERT HALF OF NORTHERN CALIFORNIA, INC.
Personnel Service
EDP SEARCH SPECIALISTS

Jerry Anderson or Bob Couch
111 Pine Street #1510
San Francisco, Ca. 94111
415-434-1900

Jim Dupre
2 Palo Alto Sq. #212
Palo Alto, Ca. 94304
415-493-8700

RH

Computer Sciences Corporation

Consider the advantages of programming in an environment where everyone doesn't speak the same language!

The special stimulation of professional cross-fertilization can be a real joy to people whose career paths have tended to limit them to developing software for a particular hardware configuration, or a single line of applications.

It can really get your creative juices flowing!

For sheer variety, sophistication, growth and an environment of professional dynamism, you really ought to look into the biggest array of truly exciting opportunities in the recent history of the CSC Systems Division.

As you can see from the specifications, it's not so much the language you speak, as your fluency.

THE LANGUAGES

COBOL
FORTRAN
HP ASSEMBLER
PL-1
TOTAL
PASCAL
ASSEMBLER

THE HARDWARE

HP 1000
HP 3000
HP 21-MX
UNIVAC 1108/1100
H Level 6
PDP 11/70
H-6000
IBM 360/370
TANDEM

THE SYSTEMS

Data Base Management • Acceptance Testing • Large Scale Applications • On-Line Systems • Budget/Finance/Accounting/Payroll • Personnel/Procurement/Inventory Control • Real-Time Process Control • Communications Systems Software • Color Graphics Programming • Microprocessor Programming, Input/Output Drives • Data Communications Programming • GCOS • GMAP • WWMCCS • Network Design

UNIVAC 1100 SERIES SYSTEMS PROGRAMMERS

—to join a major, long term program where you will be involved with a Univac 1100/44 system operating in a high volume transaction environment using TIP/DMS software.

Specific tasks will include participating in system fault analysis testing and corrections, executing the steps of the "fix/record/report" procedure for operating system software malfunctions, supporting system troubleshooting and telecommunication problems that may arise, providing support for design, testing and implementation of new enhancements to operating system software.

These positions require U. S. citizenship and the ability to withstand a rigorous background investigation.

For a prompt response, mail your resume in strict confidence to The Director of Professional Staffing, MC/218-HM.

The only limitations are the ones you bring with you.

An Equal Opportunity Employer M/F/H

CSC
SYSTEMS DIVISION
6565 Arlington Boulevard
Falls Church, VA 22046

CONNECTICUT Is A Great Place To Live & Work!!

If you're looking for affordable housing in an area with no state income tax, consider the growth opportunities our clients have for:

*Programmers
*Analysts
*Systems Programmers
*Project-Leaders

Desire experience with any of the following disciplines:

*COBOL or ASSEMBLER
*On-Line exp with CICS
*IMS
*3+ yrs. large-scale IBM
*Insurance or Financial Systems Design/Programming

If you like a fast-paced, demanding, challenging atmosphere where your individual contributions will be recognized, why not contact us to explore your career goals & objectives. We are dedicated to being worthy of your trust & confidence.

compass, inc.
900 Asylum Ave.,
Hartford, Ct. 06105
(203) 549-4240

"We are an equal opportunity employer retained search & placement firm"

A Member of National Computer Associates. Offices Nationally

Relocate to
FLORIDA!
All Expenses Paid!!

MANAGERS

IMS Data Base Mgr . . . . to $40K
Data Center Mgr. BS/BA, 370/158, OS/MVS, Mfg . . . . . to $40K
Computer Services Mgr. DEC PDP II, Fortran. . to $25K
D.P. Manager Cobol, Rpg, Life Ins. . to $32K

SOFTWARE

Systems Programmers IBM DOS, OS/VS, MVS Hnywl, GCOS, GMAP Salaries. . to 30K plus

ANALYSTS/PROGRAMMERS

370 OS, BAL, Cobol, CICS . . . . . to $26K
370 IMS, Cobol . . . . . to $30K
370 DOS, BAL, Cobol . . to $22K
Burr, NOL, DMS. . . . . to $25K

BANKING/INSURANCE

Our Clients Will Consider All Hardware As Long As You Know Cobol and/or BAL And Have BANK or INS. Exp . . . . . to $26K

Call or send resume.

availABILITY INC.

(813) 872-2831
Dept. C. P.O. Box 25434
Tampa, Florida 33623

Data Processing
COMPUTER PROGRAMMER

Auto-trol Corporation is designing a dynamic future while serving the needs of the computer graphics field, the fastest growing segment of the computer industry. Creativity has established our reputation and promoted our growth. We now have a position for an experienced Computer Programmer.

The candidate will have responsibility for financial computer applications, general ledger, accounts payable and accounts receivable. Data base and on-line experience is very desirable. Fortran or Cobol language necessary.

Join a company that encourages challenge and innovation within a rewarding environment. Auto-trol has a dynamic future awaiting the qualified individual. Send your confidential resume today.

Keith Eschenbaum
Auto-Trol Technology Corporation
12500 North Washington St.
Denver, CO 80233

Equal Opportunity Employer M/F/H/V

Auto-trol Corporation

PDP/UNIVAC/NCR/ HONEYWELL/BURROUGHS

Programmers/Analysts/Systems Analysts.
We offer the most individualized job search in the industry today on a national basis for professionals with experience on DEC, UNIVAC, NCR, HONEWELL and BURROUGHS hardware. Send resume in confidence to

SOUTHERN COMPUTER SERVICES
P.O. BOX 24833
TAMPA, FLORIDA 33623
(Client Companies Pay All Fees)

DATA PROCESSING PROFESSIONALS

Top Companies Top Salaries Fee Paid

Country wide opportunities for true proven DP professionals, Programmers to Managers, 1-10 years experience. Call us today to hear about these immediate openings.

Call toll free 800/327-7260 or in Florida call 1/305/771-9910 collect or mail your Resume with position and salary requirements to:

COSMO DATA SERVICES
5301 N. Dixie Hwy
Ft. Lauderdale, Fl. 33334

DATA PROCESSING ASSISTANT PROFESSOR

For variety of Business Data Processing courses. Proficiency in business oriented programming languages and experience in systems analysis and design desirable. Search extended. Please send resume by August 5th to:

Mrs. Marcia DeCamp
Chairperson, Business Dept.
Community College of the Finger Lakes
Canandaigua, New York 14424
EOE M/F

position announcements | position announcements | position announcements | position announcements | position announcements

PROGRAMMERS

PROGRAMMER ANALYSTS

The Leading Edge . . .

means being first in Information Systems technology. As a world leader in the sale and manufacture of gas turbine engines, our Information Systems must be state-of-the-art. That's why we can offer you a challenging career where your contributions are recognized and rewarded, and an environment designed to keep you at the forefront of technology. We have several positions available in beautiful San Diego, the city of recreational opportunities and resort living.

Our current opportunities are for Programmers and Analysts for both financial and manufacturing areas requiring experience using COBOL with IBM computers. Preferred experience includes on-line applications; OS, IMS, DLI, MVS, CICS. Hands-on programmers are required, but will include 30% to 50% analytical work.

You can expect an outstanding compensation package with exceptional salary and benefits and relocation to San Diego. For prompt consideration, please send your resume to **S.J. Scigrine:**

SOLAR TURBINES INTERNATIONAL
An operating group of International Harvester
2200 Pacific Highway
San Diego, CA 92138
An equal opportunity/affirmative action employer m/f/h/v

PACECO, INC.

A SUBSIDIARY OF FRUEHAUF CORPORATION

Data Processing

MANAGER EDP

World leading designer and manufacturer of container handling cranes and bulk loading equipment is recruiting for Manager, EDP for its new worldwide headquarters in Gulfport, Mississippi. An excellent opportunity to grow with the company.

Selectee will have heavy experience in systems analysis and some knowledge of engineering design through computers. Degree in Computer Systems or Business Management is desirable. Thorough knowledge of programming, EDP operations and principles of management is mandatory.

Initial assignment will be San Francisco area with reassignment to Gulfport, Mississippi within approximately one year. Expedite resume and salary history to: **John F. Belew, Mgr. I.R.,**

PACECO, Inc.
Subsidiary of Fruehauf Corp.
2320 Blanding Avenue
Alameda, CA 94501

An Equal Opportunity Employer

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications • Software development and systems programming • Telecommunications • Control systems • Computer engineering • Computer marketing and support.

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C.
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 08002
(609) 667-4488

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

We're Looking for DP Professionals who are Ready to Take the NEXT STEP UP

Santa Fe Energy is a Great Place to Grow

Energy is where the action will be in the coming decades, and Santa Fe Energy Company will be at the forefront. With operations in Texas, New Mexico, Utah, Wyoming, Montana and offshore Louisiana, we're the nation's fourth largest independent oil and gas exploration and development company. Our parent company, Santa Fe Industries, is one of the nation's largest diversified corporations. In addition to competitive salaries and a chance for real career growth, we offer excellent company benefits including health, dental, life, disability and retirement. Come grow with us.

Amarillo is a Great Place to Live

Amarillo sits on the northern edge of the Sunbelt, escaping the humid, suffocating summers of the deep south and the bitter cold winters of the north.
Anyone who lives here will tell you its sunsets and summer nights are the best anywhere. Its air is still the clean air of the prairie but its surrounding land has been turned into one of the garden spots of the nation.
Amarillo still boasts a western heritage and flavor but its culture, alive with art and music and literature, is a mix of influences from Denver, Dallas, Albuquerque and Oklahoma City, each of which is just a short drive away. And a half-day's drive puts you in the Rocky Mountains near any of four popular ski areas.
Its schools, including a university and junior college, are excellent. Housing is inexpensive by national standards, averaging only $28 to $32 per square foot for new brick construction. And property taxes are low. The local economy is strong and there is no state income tax. Amarillo is a great place to live and raise a family.

Our installation is an IBM 370/168 6 meg system currently running OS/VS1 with plans to upgrade to MVS this fall. We need people to fill the following positions:

SYSTEMS ANALYSTS— Six to eight years experience, the most recent three to four years with IBM OS COBOL.

DATA BASE ANALYSTS— Minimum three years experience with IBM OS COBOL.

PROGRAMMER/ANALYSTS— Four to seven years experience, the most recent three years with IBM OS COBOL.

PROGRAMMERS— Three years experience, most recent one year with IBM OS COBOL.

DATA BASE TECHNICIANS— General background DP with one year DP and/or programmer.

SENIOR MVS SYSTEMS PROGRAMMER— Minimum two years experience with MVS system generation and maintenance. Working knowledge of COBOL, FORTRAN ASSEMBLER, OS/JCL and utilities required. Experience desirable in data base systems, data communications and computer performance evaluation.

Send resume and Salary history to:
Personnel Department

SANTA FE ENERGY COMPANY
One Security Park • 7200 I-40 West • Amarillo, Texas 79106

Equal Opportunity Employer M/F

EDP INSTRUCTOR

Nat'l. vendor requires analytical & results-oriented pro. to develop & teach software courses. Bkgrd. should include prog. or analysis exp. Excellent growth oppty. In a corp. educ. dept. Salary low 20's. Contact Gerry Battista.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

DATA PROCESSING MANAGER — BANK

Aggressive, profitable western Kentucky bank with $170 million + in resources is seeking a data processing manager. The bank plans to acquire an IBM 4331 DOS/VSE system and the latest banking software applications. The d.p. manager will have responsibility for installing, converting, and managing the data center (including the hiring of staff).

Candidates should have a minimum of 3-5 years of experience in bank data processing and possess the ability to interface with key operating departments and manage staff.

Attractive compensation package, challenging opportunity in an excellent bank, fine community.

Submit resume and salary history in confidence to Owensboro National Bank, 230 Frederica Street, Owensboro, Kentucky 42301, Attn: E.D.P. Committee.

Equal Opportunity Employer M/F.

DATA PROCESSING

IBM/NCR Environment

H.J. WILSON Co., Inc., is the Sunbelt's leading catalog showroom retailer with 45 locations from Colorado to Florida. Expansion is creating career opportunities for professionals interested in the following areas:

Current configuration includes IBM 370 OS/VS1, CICS; NCR V-8585M/VRX; and NCR 8200 IMOS/STORES IV utilizing On-Line and Data Base technology.

Retail experience desirable and POS, Inventory Mgt., and Business and Merchandise applications.

Positions located in corporate headquarters in Baton Rouge, one of top ten growth markets in America. Send resume of experience and salary to: Robert S. Harlowe

H.J. WILSON CO., INC.
5825 Florida Blvd.
P.O. Box 66221 D
Baton Rouge, LA 70896

We Are An Equal Opportunity Employer M/F

position announcements | position announcements | position announcements

SENIOR PROGRAMMER/ANALYSTS

General Physics Corporation is an industry leader in providing information management services to electric utilities and other industries. We are currently seeking highly motivated programmer/analysts for challenging positions in information management software development.

Applicants should possess: • a minimum of 3 years professional programming experience; • working knowledge of two or more high level programming languages, preferably FORTRAN, BASIC or COBOL; • experience with two or more hardware systems, preferably multi-user minicomputers such as PR1ME, MICRODATA, HP1000, WANG 2200 VS, or DEC PDP-11; • good technical writing skills, with experience in preparing user and programmer documentation; • experience with DBMS software and experience within the electric power industry is desirable but not required.

General Physics is a progressive, growth-oriented company, offering competitive salaries, liberal education and health benefits, and a desirable location. Submit your resume in confidence to:

GENERAL PHYSICS CORPORATION

P. K. Parker
Manager, Computer Services
General Physics Corporation
1000 Century Plaza
Columbia, MD 21044
EOE M/F

GP

PROGRAMMER/ANALYSTS

UNIX

We are a diversified corp with several data centers around the country. We are currently in the process of expanding our PDP II UNIX and UNIX "C" operations. We seek qualified applications, software and management professionals at all levels who have appropriate UNIX experience.

Positions are available in all CHC cities: New York, New Jersey, Chicago, Houston, North Carolina, Tulsa, Miami, Atlanta and San Francisco. We offer an above average salary, a full benefit program plus a dynamic working environment.

Please respond, indicating your salary history, in strictest confidence to:

David Reingold
National Recruiting Director
COMPUTER HORIZONS CORP.
747 Third Avenue
New York, New York 10017
An Equal Opportunity Employer M/F

Discover San Francisco's Resources

Consider a career in the beautiful San Francisco Bay Area. If you are an experienced Programmer or Analyst, with a knowledge of COBOL, OS, JCL, ALC, IMS, DATA BASE SYSTEMS and COMMERCIAL APPLICATIONS, contact your best resource and discover your prospects for advancement and high salaries.

Call collect or write.
Naturally, the employer pays all fees.

LOGICAL OPTIONS, INC.

One Market Plaza, Spear Tower
Suite #2014 C
San Francisco, CA 94105
(415) 777-3900

PROGRAMMER ANALYST

Requires 2-4 years' experience on an IBM 370 OS system with ANSI COBOL and/or BAL experience. Knowledge of banking applications is highly desirable.

We offer excellent career opportunities with competitive salaries and a superior benefits package which includes medical, dental, vision and profit sharing. Please send resume including salary history to: **V.F. Garvy, NATIONAL BANK OF ALASKA, P.O. Box 600, Anchorage, Alaska 99510.** An equal opportunity employer, m/f.

NBA NATIONAL Bank of Alaska

COMPUTER SCIENTISTS

San Francisco Peninsula

We don't think software has to have bugs. We are developing the techniques that will be used to create the bug-free software of the Nineties. We already use daily techniques others only talk about; soon we will be using techniques they haven't thought of yet. We are looking for individuals who want to be in the vanguard in using:

- Formal specifications
- Program verification
- Development support environments
- Ultra-modern high-level
- Malleable hardware architectures
- Automatic theorem proving

If you have related experience in one or more of these areas, we'd like to talk with you. Please send your resume to: **G.B. Tehan, (MS-D04), Dept. JT-10, 3939 Fabian Way, Palo Alto, California 94303.** An Equal Opportunity Employer m/f.

Ford Ford Aerospace & Communications Corporation
Western Development Laboratories Division

FIELD ENGINEERS NATIONWIDE OPENINGS

Challenging position with nationwide computer organization offering superior salary, excellent benefit package and an opportunity for career advancement. Candidate should have experience in maintaining Sigma and XDS 500 equipment and have worked on a wide variety of peripherals.

For consideration call or write:

Don Hyde
(800) 854-3128
Telefile Computer Products
17131 Dainler Street
Irvine, CA 92714

Systems Programmers

FOR A COMPUTER-AIDED DESIGN TEACHING FACILITY

Permanent position with responsibilities in system level software development and system management for a computer aided, design teaching facility for undergraduate engineering education. Selected person will help with maintenance of a large VAX-based computer system with sophisticated graphics equipment. Other responsibilities will include maintenance and enhancement of graphics software, consulting with faculty and teaching assistants responsible for instructional software development (including graphics software education), and facility management. Knowledge of DEC operating systems and systems programming experience is necessary. Background in graphics software and hardware, Fortran and general engineering education is preferred. Selected applicant must be able to work successfully with others.

FOR A COMPUTER GRAPHICS RESEARCH FACILITY

Long term position with responsibilities for the system management of a computer graphics research facility. Responsibilities include system level and graphics software development. Selected candidate will help with the maintenance of a large VAX-based computer system with sophisticated graphics equipment. Other responsibilities will include maintenance and enhancement of graphics software and consulting with faculty and graduate assistants on several research projects. Knowledge of DEC operating systems and systems programming experience is necessary. Background in graphics software and hardware, Fortran and assembly language, and video technology is preferred. Selected applicant must be able to work successfully with others. Equipment includes: VAX PDP 11's, E&E Multi-picture Systems, Color Raster frame buffers and Tektronix storage tubes.

Contact: Dr. Donald P. Greenberg, Director Program of Computer Graphics

Cornell University
130 Rand Hall, Ithaca, N.Y. 14853; (607) 256-7444
An equal opportunity/affirmative action employer

FLORIDA!

BANKING/FINANCIAL/ EDP

We have a prestigious client, located in Florida, who is seeking individuals with bank programming experience. If you have experience in any of the following equipment we have a new career for you!

IBM, DOS, VS, PVS

NCR Criterion, B-3, B-4, VRX, NEAT III, CIF

IBM SYSTEM/32,34

BURROUGHS

Send detailed resume or call BILL BLEDSOE, DRAKE PROFESSIONAL SERVICES, 930 WOODCOCK RD., SUITE 222, ORLANDO, FL 32803 (305) 896-0676.

ALL FEES PAID BY CLIENT COMPANY SERVING THE SUNBELT.

We are seeking to fill
477 EDP Job Openings in the San Francisco Bay Area

You'll find little evidence of recession in the computer careers market in the San Francisco Bay Area. Growth continues at a rapid and steady pace, with heavy demand at all levels for qualified EDP personnel. Our client companies pay all fees, interview and relocation expenses.
The Computer Resources Group, Inc., is a long-established (8 years), highly respected (150 leading companies utilize our services), and alert organization (our data bank of computer professional needs is unmatched in the San Francisco area).
Send us your resume today or call collect.

COMPUTER RESOURCES GROUP INC
303 Sacramento Street, San Francisco, CA 94111
(415) 398-3535 or 3333 Bowers Avenue, Suite 130
Santa Clara, CA 95051 (408) 727-1650
AFFILIATES IN 25 MAJOR U.S. CITIES
An employer-retained professional placement service

SENIOR SYSTEMS ANALYST

Project leader for mfg. & financial systems areas. Resp. include developing & implementing information systems, feasibility studies plus directing programming staff. IBM 370 RJE site. Client co. located in Central NY is ready to hire. Salary $27,000. Fee paid. Contact Pam Siegal.

Robert Half of Buffalo, Inc.
Agency
1310 Liberty Bank Building
Buffalo, NY 14202
(716) 842-0801

NOTICE OF FACULTY VACANCY
POSITION: Data Processing Instructor
QUALIFICATIONS: 1) should have baccalaureate degree in computer related field; 2) at least 3 years work experience in computer field; 3) teaching experience; 4) should be proficient in programming at least two of the following languages: RPG or COBOL, BASIC, FORTRAN.
RESPONSIBILITIES: Teaching Data Processing Technology courses, including programming in several different computer languages.
SALARY: Nine month base salary from chart based upon degrees and teaching experience.
APPLICATION DEADLINE: August 1, 1980
APPLICATION PROCEDURES: Submit letter of application, complete resume and transcript of all college level course work to:
Ms. Susan K. Herd
Vocational - Technical Division
Texas Southmost College
Brownsville, Texas 78520
Texas Southmost College is a Community Junior College with an enrollment of approximately 5,000. Texas Southmost College is an Equal Opportunity Employer.

LIBRARY SYSTEMS ANALYST, with responsibility for maintenance, continued development and enhancement, and planning and development of existing and new library automated systems in the Minnesota State University System. **Education:** Bachelor's Degree in Computer Science, with coursework in library/media education and/or a Master's Degree preferred. **Experience:** Work with UNIVAC 1100 computer or comparable system, familiarity with timeshare systems and communications theory, knowledge of COBOL programming and of data management procedures, with knowledge of library data processing applications desirable. **Salary:** Commensurate with education and experience, with range starting at $18,000. Three-year term contract, with probability of continuing for indefinite period. **Letter of application, resume, and names of three references must be received by September 5, 1980. Apply to: Dale Carrison, Dean of Library, Mankato State University, Mankato, MN 56001.**

position announcements | position announcements | position announcements

informatics inc

PROGRAMMER/ANALYSTS
Are You Seeking New Challenges?
Join the INFORMATICS Team Today!!!

INFORMATICS INC., the largest independent supplier of commercial software services in the U.S., is continuing to expand in the Houston area.

We are seeking professionally-minded people who want to be a part of our PROFESSIONAL CONSULTING STAFF with 2 or more years experience in one or more of the following disciplines:

LANGUAGE	SOFTWARE	HARDWARE
COBOL	IMS	IBM 360-370
ALC	CICS	UNIVAC 1100
PL/1	MARK IV	MINIS

PL1 and IMS
DATA BASE MANAGEMENT
DISTRIBUTED DATA PROCESSING

Our opportunities for client exposure, diversified career development, and long term professional growth are unequaled. We also offer excellent salaries, paid overtime, and a comprehensive benefits package, including dental insurance. Become part of a people-powered organization! Send your resume in confidence to:

Informatics Inc.
1035 Dairy Ashford, #114E
Houston, Texas 77079
(713)493-6681

informatics inc
Professional Services Operations
Western Division
An Equal Opportunity Employer

COBOL/BAL PROGRAMMERS

Advanced Systems

Help us expand our department, and your potential.

E.F. Hutton is one of America's leading brokerage and investment banking firms. We've enjoyed 76 years of steady growth, without merging. Our growth is why we're expanding our programming department. It's a good reason for you to join us at our New York headquarters.

We'll provide a wide variety of projects to work on, and the chance to solve problems creatively in an OS/MVS environment. And since we're expanding, you have a ground floor opportunity to move up to analysis and systems development.

If you have a BS in Computer Science, Math or Business, and at least one year of programming experience in COBOL, plus knowledge of OS/JCL, rush your resume to us.

PROGRAMMER/ANALYSTS

We're also seeking individuals with a minimum of 1 year's experience in Assembler or COBOL, and some background in CICS, OS/JCL, utilities.

Resumes should be sent to Personnel Department.

EF Hutton
One Battery Park Plaza
New York, N.Y. 10004
Equal Opportunity in Action M/F

UNIVERSITY OF VERMONT SYSTEMS PROGRAMMER

The Administrative Computing Center is seeking a Systems Programmer with a Bachelor's Degree, and at least 5 years of experience with IBM operating systems, preferably DOS and/or VM. Applicants with experience in on-line systems or DBMS are preferred. This position is part of a 3 member team responsible for the support of VM, DOS, the OASIS DBMS, and other state-of-the-art software on our IBM 3031 system. Teh University offers an excellent benefits package, and the salary is high teens to low twenties. **Send resume and names of 3 professional references by August 4, 1980 to University of Vermont, OMIC 238 Waterman Building, Burlington, Vermont 05405.**

An Affirmative Action Employer

ROBERT HALF

HOUSTON
CITY OF OPPORTUNITY!

Energy Company
Will buy house and pay interest differential plus relocation for the right people!

Prog/Analyst. $20-23,000
System Analyst $23-25,000
Sr. Sys Analyst $28-33,000
Must have IBM 370/MVS COBOL exp. Prefer Oil & Gas accounting systems and IMS.

Life Insurance
New positions for new development projects.

Programmers $17-23,000
Prog/Analysts $21-25,000
Sys. Analysts $20-25,000
Sr. Sys. Analysts $23-28,000
Proj Leaders $27-31,000
IBM 370/OS COBOL exp needed.

Consulting
Houston Regional office expansion to Dallas - Denver - Oklahoma - New Orleans. People are needed from Programmers to Project Managers.

Programmers $20-25,000
Prog/Analyst. $24-29,000
Sr. Prog/Analyst $28-35,000
Proj Leaders $32-36,000
Proj Managers $34-40,000
Must have large IBM OS equipment experience and IMS or CICS or ADABAS. Mark IV a plus.

For further information, call JIM FLEMING at 713/688-1800 (collect) or send a copy of your current resume to:

ROBERT HALF EDP DIVISION
720 N. Post Oak Rd. #228
Houston, Texas 77024

SYSTEMS PROGRAMMER/ ANALYST

St. Catherine Hospital has an opening for a Systems Programmer Analyst. The Programmer is responsible for the complete computer operation, NCR I8430, operating systems IRX, Cobol language computerized operations include accounts receivable, general ledger, billing and capital equipment with projections for accounts payable and payroll.

The position is in a five member department in a 117 bed acute care general hospital in Southwestern Kansas. The community of Garden City is 22,000 and growing, with population increase of 10,000 in the near future. **Call collect, Marcella Diller, St. Catherine Hospital, 403 E. Fifth St., Garden City, KS 67846, (316) 275-6111.**

SYSTEMS ANALYST

Position offers a substantial challenge for a talented self-starter to become part of an ambitious program designed to revise all existing administrative systems of the University. Position requires a minimum of four years experience with business systems and procedures. Familiarity with DEC 2050 equipment, ANS/COBOL and/or university systems is highly desirable. Undergraduate degree a minimum. Responsibilities include the design, development, analysis, evaluation and installation of administrative and business sytems with attention to defining user requirements, systems definition and specifications. We offer an attractive salary and fringe benefits. For confidential consideration, send a letter or resume with salary history to **Mr. Frank D'Arcangelo, Director of Systems Development, Tulane University, New Orleans, Louisiana 70118 by August 15, 1980.**
AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER

Computer Sciences Corporation

R2D2
Ahead of its Time?

At Computer Sciences Corporation, Career Potential Is Soaring . . . All The Way To The Stars!

Computer Sciences Corporation, the world's largest independent software company, is currently responsible for providing state-of-the-art communications support for NASA's Goddard Space Flight Center in Greenbelt, Maryland. We have outstanding career opportunities available for professionals experienced in specialized areas. Please investigate the following opportunities at our CSTA facility.

SYSTEMS PROGRAMMER: Experienced in IBM 370 series computers. Knowledge of VS 1 and VM. Technical degree not required.

SR. PROGRAMMER/ANALYST: Experienced in IBM 360/370, ALC, and standard IBM access methods. If you are interested in moving from business applications to scientific applications, this position could be your catalyst.

PROGRAMMER/ANALYST: Experienced in SEL 32/75, FORTRAN and Assembly.

SR. PROGRAMMER/ANALYST: Experienced with Univac 1108, EXEC 8, and Assembly Language. Task leadership a plus.

All positions require a BS in Math, Computer Science, Engineering or Physical Science.
CSC offers competitive salaries and an excellent benefits package. For immediate consideration, please call collect or send resume to: **J.W. WENDELL, (301) 794-6360.**

The only limitations are the ones you bring with you.

CSC
Applied Technology Division
CSTA Facility
10210 Greenbelt Road
Seabrook, Maryland 20801
An Equal Opportunity Employer

The Way To The Future
WESTERN BANCORP DATA PROCESSING COMPANY

WBDPC is a leader in developing bank services and technology, having designed and built the financial industry's most sophisticated telecommunications network and the largest on-line teller terminal network in the country. We are deeply involved in designing, building, and operating DP systems in the 1980's. We have 18 data centers located throughout the eleven western states. Our Portland office is conducting a search for:

IMS SOFTWARE PROGRAMMER
Reports to Group Manager - Data Base Management Systems. Must be familiar with IMS and/or CICS network concepts, have working knowledge of Assembler language, basic on-line system concepts, and problem analysis techniques. Will participate in the design, implementation, testing and maintenance of new or revised on-line systems. Direct the collection and compilation of statistics, performance records and historical data concerning the on-line system. Consult with programmers and NYO's to assure the efficiency and effectiveness of procedures.

MVS SOFTWARE PROGRAMMER
Reports to Group Manager - Software Services. Must have two years experience in Systems Programming, extensive knowledge of PUT/PTF applications, IBM OS/JCL and Utilities, TSO, BAL and MVS concepts, and system generation process. Will evaluate the cause of all critical system software malfunctions, apply all necessary repairs, maintain the operating system and system components, and supervise modifications of all such software.

SENIOR SOFTWARE PROGRAMMER
Reports to Group Manager - Software Services. Must have previous experience in hardware/software analysis and vendor contacts, Operating Systems, compilers, access methods, project management, and large scale IBM equipment. Will supervise the daily technical activities of other System Specialists by providing debugging, installation, and maintenance support for Systems Software, establish Software standards, and determine the cause of and effect repairs on all critical systems software malfunctions. Perform evaluations, develop feasibility studies and make formal recommendations regarding the acquisition of Software Products.
Western Bancorp offers an excellent Benefits Program including Employee Savings Plan, Referral Bonus, Relocation Allowances, and Tuition Reimbursement.
Send resume with confidential salary history to:

Charmaine H. Maki-Merrick,Employment
Western Bancorp Data Processing Company
P.O. Box 230 Portland, Oregon 97207
An Equal Opportunity Employer
(503) 225-2193
WESTERN BANCORP
. . . Working on tomorrow's banking environment today!

position announcements | position announcements | position announcements | position announcements | position announcements

PROGRAMMER

RUTGERS

The State University of New Jersey

Has recently installed a Dec System 20, 2 VAX-11 Supermini and 53 Micro computers, at the Center for Computer and Information Services creating the following openings:

Ref. #14 & 15: Programmer Analyst.
Requires bachelor's degree plus extensive programming experience including knowledge of timesharing, particularly interactive text editors. Ability to teach and document.

Ref. #17: Systems Programmer II.
Bachelor's degree and several years experience in systems programming and advanced uses of digital equipment.

Ref. #19: Programmer I.
Bachelor's degree plus a few years programming experience including a knowledge of timesharing systems.

Ref. #23: Systems Programmer I.
Bachelor's degree plus extensive experience in systems programming, primarily third generation computers. Requires comprehensive experience in timesharing and telecommunications applications and software/hardware education.

Ref. #24: Lead Systems Programmer.
Bachelor's degree plus extensive experience in systems programming, primarily third generation computers. Also requires experience in consulting techniques, systems design and operations.

Salaries range into the 20's, commensurate with experience.

Comprehensive benefits program, including educational opportunities.

Submit resume, indicating Reference Number for specific position, to:

Mr. Norman Wattenberger
CCIS
Hill Center, Busch Campus
P.O. Box 879
Piscataway, N.J. 08854
Affirmative Action/Equal Opportunity Employer

IMS ANALYST

State-of-the-art retail/mfr. requires DB/DC analyst to lead new appe. devel. projects. IBM 370 OS/VS1, IMS environ. Oppty. to join rapidly expanding corp. group with strong growth-minded mgmt. team. Salary $28,000. Contact Gerry Battista.

Robert Half of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200
Personnel Consultants

PROGRAMMERS OVERSEAS EMPLOYMENT

EDP-Advanced Systems Analyst

Degree required plus a minimum of (5) years of progressive experience in major systems design/analysis and programming commercial applications. Our system is comprised of IBM 370/135, 512K core, disk and tape peripherals, terminals 3720 series. Languages ANS/COBOL, MARK IV, FORTRAN, ASSEMBLER. We are currently converting from batch to terminal processing using CICS/VS. A good knowledge of COBOL and familiarity with CICS/VS plus IBM S/370 DOS/VS power operating system is desirable.

Salaries commensurate with experience, plus generous overseas premium, plus an extremely attractive savings plan and other benefits. Family residence, plus 30 days annual vacation and an excellent opportunity to travel and save money.

All replies confidential. Send complete resume of work experience, salary requirements, and personal data to:

OASIS OIL COMPANY OF LIBYA, INC.
Personnel Representative
1270 Avenue of the Americas, New York, New York 10124

halbrecht

OR/MS EDP/MIS

$28,000 to $50,000

Since 1957, discrete, professional recruitment & career placement services in the quantitative business sciences & data processing employment markets. Call or send resume to Dept. EC.

Halbrecht & Co.
201 East 42nd Street
New York, N.Y. 10017
(212) 682-3333

7927 Jones Branch Drive
McLean, Va. 22102
(703) 442-8158

PROGRAMMER

Charlotte Data Center has on-line system in a multi-division organization. We are looking for a programmer who relates well to senior programmers and is promotable.

JOB REQUIREMENTS:

- 2 years with ANS COBOL in industrial environment
- conversant in job control languages, editors and debugging aids
- degreed in computer science or related field
- experience with UNIVAC 90/60-90/80 or IBM 370 OS

Excellent salary and benefits and advancement opportunity. Send salary and resume in confidence to:

Rexham
CORPORATION
Chad Mitchell
Manager, Corporate Recruiting & Development
P.O. Box 4058
Charlotte, North Carolina 28204
An Equal Opportunity Employer M/F/H/V

APPLICATION DEVELOPMENT MANAGER

Pacific Northwest

Join a professional System and Programming department of a major commercial bank headquartered in Spokane, Washington. The position will play a lead role in selecting and installing new bank systems in a competitive state wide banking environment. This is a key position reporting directly to the Vice President in charge of Systems and Programming.

Responsibilities will include the management of analysts and programmers, installing new banking systems in IBM 370 computers under OS/VS1, CICS, VSAM. Good communications skills, thorough knowledge of banking systems, and project management skills are a must. A bachelors degree, programming and analysis experience, and at least two years' in a mangement position are desired.

For consideration please submit resume and salary requirements to: Old National Bank, Human Resources, Department, P.O. Box 3588 TA, Spokane, WA 99220. *We are an equal opportunity employer.*

ONB
Old National Bank
Let's take care of tomorrow, together

SITUATION WANTED

COMPUTER PROFESSIONAL

Heavy hitter with great Sales/Management Stats.

Earning in excess of $50,000.

Will beef up your bottom line.

Serious parties call direct:

Mr. Production
(617) 481-0740

FLORIDA

Major South Florida corporations have immediate need for professional talent in the following areas. No fees or contracts. Interviewing & relocation expenses paid.

- Data Base Analysts IMS or IDMS 30K
- Sr. Systems Analyst Manufacturing Systems 30K
- Sr. Systems Analyst Acct/Financial systems 28K
- Prog/Analysts IMS 28K
- Banking Systems Analysts 28K
- Systems Programmers MVS 28K CICS 28K
- Scientific Prog/Analysts Assembly or Fortran-processor level 32K

Arthur Stevens Assoc. Inc.
801 Monterey St. Suite 204
Miami, Fla. 33134

BUY SELL SWAP

For Sale
IBM 3741-1
Proof keyboard
Record Insert
Feature Group A
$2300

Boynton Business Systems, Inc.
145 Route 208
Montgomery, N.Y. 12549
(914) 457-9221

DEC VAX SYSTEM
September 1980 Delivery
2MB Memory, Floating Pt. Processor
24 Ports, 75 IPS/800 BPI Mag Tape
Battery Back-up, RM03-67MB, RM05-300MB
Fortran & Basic. **DEC's LIST PRICE $276,280.**
Take all or any options.
CALL: David Lewis
Computer Timesharing Corp.
(714) 226-1334

For Sale
Data General
Nova 2's (3)
Nova 3's (3)
Eclipse Expanded C3000 (1)
20 megabyte disk subsystems (4)
Selling & Servicing Data General and others.
Call 315/455-5638
Darryl Sanford
CENTRAL COMPUTER SERVICES CORP.
Syracuse, N.Y.

E.D.P. SAFES
All sizes available new and used — protect your disc packs etc. from fire and humidity — also data safe-files. Write for catalog or call Mr. Monroe, Empire Safe Co., 137 Grand St., NY 10013 (212) 226-2255.

FOR SALE
7 Months Old
BC7-700 PROCESSOR
With 10 million bytes of disk storage.
Includes two work stations.
RPG II
714/272-1202

FOR SALE BY OWNER
DEC
2-RP06 w/Controller
4-RM03 Compatible w/ Controller
2-TU45 w/Controller
All items running on our 11/70
All available for immediate delivery:
Computer Resources Corp.
5680 So. Syracuse Circle, Ste. 118
Englewood, Colorado 80111
303-771-8930

CICS TECHNICAL SUPPORT SPECIALIST

GROW WITH A LEADER

We're Candle Corporation, innovators in state-of-the-art software technology. To meet our growth needs, career positions are available to provide CICS technical support at our new northeastern regional center in New York City and our Los Angeles headquarters. To take advantage of this opportunity, you must have at least two years of indepth experience with CICS and good communications skills. Please call or forward your resume and salary history in confidence to:

Kenneth Martin
Candle Corporation
4676 Admiralty Way Suite 401
Marina del Rey, CA 90291
(213) 821-2902

THIS SPACE FOR HIRE.

[Inquire at Classified Advertising Dept.]

COMPUTERWORLD

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

CMI

AMERICA'S LEADING SPECIALIST SERVING THE USED MARKET

3033 Lease Financing and Purchase Leaseback New and Used — Jack Shevillo

WANT TO BUY 3032-U4 with 3850 August-September — Jack Shevillo

3031 Lease Terms Available — Bob Laurie

WANT TO BUY 3031 Any Memory Size Aug. or Sept. Delivery — Bob Laurie

3168 Machines Features Memory — Gary Smith

SYSTEM 3 Models 12 and 15 — Dennis Pennington

3158 Short Term Leases Attached Processors Available

3148 3138 Lease or Sale Immediate Delivery — Bob Laurie

4341 We Want to Buy or Sublease Your Machine We have late '80 Delivery Positions

3155 3145 3135 3125 Buy/Sell/Lease — Joe Romeo

COMMUNICATIONS Buy-Sell-Lease IBM 3705 IBM 3704 Immediate Delivery Configured To Your Requirements — Joe Romeo

SYSTEM 34 All Models, Upgrades and Peripherals Available Now! — Forest Benaway

3278 3274/3276 3741/3742 3277's with any Keyboard — Kay Richard

3830 3420 3370 3411 3350 3203 3340 3211 Buy/Sell/Lease — Pat Callahan

360/20 Series 1 1130 — Marie Bednarz

CMI CORPORATION Since 1969

755 W. Big Beaver, 19th Floor, Troy, Michigan, 48084

(313) 362-1000

MARKETING
Dallas, Texas (214) 385-0806
New Jersey (609) 645-7282
Montreal, Quebec (514) 288-8455
Windsor, Ontario (519) 258-8910
Geneva, Switzerland Telex: 289073 CMI CH
Paris, France Telex: 613910 CMI FR
Hamburg, W. Germany Telex: 211897 CMIHH D

CMI FINANCIAL SERVICES
San Francisco (415) 392-4800
Atlanta (404) 396-7575

Member CDA / CLA

WANTED • BUY or SELL

Wanted to Sell

DEC
VT-50AA, VT-100AA, Short Cabinets
(Used) (New) (Now)

CDC
96 Megbite Drives (New)
80 Megbite Drives (Used)

TALLEY
2200 Printers (New/Used)

DATA GENERAL
Nova 1200 (Used)
Micro Novas (New/Used)
8K Core Memory (Now)

ISS
25 Megbite Drives

PERTEC
• (New) Disk Drives, Front Load, 12 Sector, Model D3442-M012
• (New) Tape Drive T-9640-96-75 with Western TC-130

DISK CARTRIDGES (Special)
New/Error Free
Top Load Type 5440 CDC #89290003
Front Load Type 5440 CDC #88255018

MISCELLANEOUS BULK CABLE (New)
• Telephone/Communication 12,000 Stranded 4C #22 gauge Mylar Shielded
• I/O 5,000 Stranded 27C #22 Shielded
5,000 Stranded 18 Twisted Pair #22 gauge Mylar Shielded

BELL & HOWELL
BHD900TS4 (New) Line Printers

CENTRONICS
301-165 CPS-80 Column Printer (New)

Wanted to Buy

DEC
M7895ya/OSS-11A
M7896yc/OSS-11MR
M7879yb/ORS-11B
M7894/ORS-11MP
MM11yp and DSP11A

TAPE DRIVES
TS11-DA

DISK DRIVES
RWM03-AA and RM03-AA

AMPEX
50 Meg Disk Drives

IBM
4331-2 CPU
3315-A2 Drives
3370-A1 Drives

DATA GENERAL
Eclipse S140 with 1024KB Memory

AMPHENOL
15 Pin Edge Board Connector Part #84-18 Any Quantity

Dimension Systems
1701 Meadow Valley, Irving, Texas 75060
Box 61527 (DFW) Dallas, Texas 75261
(214) 253-5131 (214) 253-4000

IBM Unit Record Equipment
Disk Packs and Data Modules

Mach	Sale	Lease
026	$ 750	$35/mo
029	Call	$45/mo
082	$ 750	$35/mo
083	$1700	$60/mo
084	$2750	$125/mo
085	$1200	$60/mo
088	$2750	$125/mo
129	Call	$110/mo
548	$1500	$ 60/mo
557	$3500	$125/mo
3742	$3800	$175/mo
360/20		Offers

Pack	Sale	Lease
1316	$ 39	—
2316	$ 99	—
3336-1	$149	$10/mo
3336-11	$299	$20/mo
3348-70	$899	$60/mo
Cartridge	$39	—

Other machines, packs, also available.

Thomas Computer Corporation
600 North McClurg Court, Chicago, IL 60611 (312) 944-1401

dataserv

Your Authority in the IBM Second Market

Call Dataserv when you need to know Second Market equipment values, market conditions, or answers to other questions. People who know Dataserv trust Dataserv. We help you get maximum satisfaction with Second Market transactions. If the equipment you want to buy, sell or lease isn't listed, call our toll free number.

GSD SYSTEMS

SYS 3	SYS 32	SYS 34	SYS 38
Short Term Lease Avail	Sale or Lease All models	All models New or Used	Over 50 Del. Pos. Avail

DPD SYSTEMS

138 Short Term Lease Avail	148 Immediate Del. Short Lease	158 Sale or Lease 12-60 Mos	43X1 Immediate Del. Sale Lease
125	135	145	155

Memory available for all IBM Processors

PERIPHERALS

3330	3410	3203	1403
3340	3411	3505	1442
3350	3420	3525	2501

All peripherals available on short or long term lease

1255	1419	3880
All models Sale or Lease	On Line or Off Line Lease Sale	Avail. now Flexible Terms

dataserv Your Authority in the IBM Second Market

CALL TOLL-FREE 1-800/328-2406

DATASERV BUILDING, 9901 WAYZATA BOULEVARD, P.O. BOX 9488, MINNEAPOLIS, MN 55440

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

IBM PERIPHERALS
SALE OR LEASE
DASD 3310 3344 3330 3350 3340 3370
TAPE UNITS 3420 3410 ALL MODELS 8809
PRINTERS 1403 3203 3289 3211
CONTROLLERS 3803 3811 3830 3846 2821 3276 3274 3272 3271 2540
CARD I/O 3505 3525 1442
DISPLAY STATIONS 2501 3278 3277
MICR 1419 SINGLE/DUAL-ADDRESS
MOST ITEMS AVAILABLE FOR IMMEDIATE DELIVERY
Contact: Bernie Gest
215-782-1010
Computer Marketing Inc.
7704 Seminole Avenue
Phila., Pa. 19126

TIGER COMPUTER
415 Madison Ave., New York, N.Y. 10017, (212) 532-1500
Buy/Sell/Lease 3350's 3340's 3344's 3330's 3830-1's 3830-2's 3803-1's 3803-2's 3420 Tapes All Models
370/168-J w/5 megs Independent Memory Available Immediately
3031/ 3032/ 3033 Purchase/Leaseback
Exchange 3158-U36 Avail. 1/80
Sale or Lease 3310's New or Used 3370's New Available Immediately
Available for Lease 3138-J Available 10/80
Available for Lease 4341-L1 4331 Model 2
Lease short term 3148-K w/ISC, Madrids 3138-J Available Immediately
SPECIAL "Want to buy" 3031-4 Delivery Now
A TIGER INTERNATIONAL COMPANY
MEMBER CLA/CDA

S/32
S/34
S/3
S/38
BUY • SELL • LEASE
COMPUTER OPTIONS, INC.
The Best Option in IBM Computers
Parkdale Plaza Bldg. #540W
1660 So. Highway 100
St. Louis Park, MN 55416
612 • 540 • 8660
800 • 328 • 5718

DIEBOLD
COMPUTER LEASING
BUY•SELL•LEASE
ALL CPU's & PERIPHERALS
360 303X
370 4300 Series
IBM
CARD READERS & PUNCHES
PRINTERS
CONTROLLERS
AVAILABLE NOW
CALL DIEBOLD
800-631-1602 201-569-3838
TWX 710-991-9733
177 North Dean Street, Englewood, New Jersey 07631
Member: Computer Lessors Association and Computer Dealers Association

WHEN YOU NEED DEC . . .
TERMINALS
• VT-100
• LA36
• LA120
• LA180
PDP11/03 SYSTEMS
LSI/11 MODULES
Demand. . .Delivery
Demand. . .Discounts
Demand. . .UNITRONIX
UNITRONIX CORPORATION
(201) 874 8500
198 Route 206
Somerville, NJ 08876
TELEX 833184

EQUIPMENT AVAILABLE

Description	Currently Available For Lease	Date
370/158		
158-U35 (ISC and Madrids)	lease only	7/25/80
158 Memory - 1 meg (IBM-3rd)	lease only	now
158 Memory - 1 meg (CDC)	lease only	now
M upgrade and 3058 and 3058 for 158	sale or lease	now
1435, madrids, 7840, 1850 7905, 3213	sale or lease	now
370/168		
168 Memory - 3 megs (IBM - includes 5th)	lease only	7/01/80
2860 - 3	lease only	now
3851's (3)	sale or lease	now
370/145		
6983, 6984	sale or lease	now

CONTACT:
LFC
Jack A. Northrop
Lease Financing Corporation
3 Radnor Corporate Center
100 Matsonford Road
Radnor, Pa. 19087
215/527-4450

For LEASE (We're sole owners)
IBM 4341 Model L
PROCESSOR & CONSOLE
* HI-SPEED I/O Set Make offer
* 3742 DATA SYST. from $3395
* 029 All Models from $1575
* 129-3 from $2850
Special . . . . While They Last!
IBM 3742 $3395. or Lease $135. per mo. (based on 24 mo.)
CALL GEORGE GILMAN
I.O.A. DATA CORP.
Toll Free 800-221-8438
N.Y. (212) 673-9300
383 Lafayette Street, New York, N.Y. 10003

H•P
BUYING-SELLING
3000 SYSTEMS
2000 SYSTEMS
1000 SYSTEMS
CRISIS COMPUTER CORP
2356 Walsh Ave. Santa Clara, CA 95051 408-727-6431
For domestic and international sales. TWX 910 338 7532

MINICOMPUTERS AND SYSTEMS
"Don't waste company Time or Money. Check with us before you Buy or Sell"

Nova 1200 Jumbo with 16KW Core	$3,000
Nova 1200 Jumbo with 32KW Core	$3,900
Nova 1200 Jumbo System; 32KW Core; 4046/ 4047 Disk; I/O with Real Time Clock	$8,235
Nova 2/10 with 16KW Core	$3,000
NEW DEC Station 7840/BA with 16KW Core.	$5,600
DEC 11/23's — Immediate Delivery.	$6,800

Many other computers, peripherals, and components. New and Used.
minicomputer exchange inc.
CALL TODAY (408) 733-4400
TWX 910/339-9272

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

O.P.M. LEASING SERVICES, INC.

The Custom Leasing People

Branch Offices

ATLANTA ..... (404) 953-0926
BOSTON ..... (617) 749-4844
CHICAGO ..... (312) 945-8130
DALLAS ..... (214) 641-7870
DENVER ..... (303) 499-4488
DETROIT ..... (313) 996-5811
HOUSTON ..... (713) 367-1668
KANSAS CITY ..... (816) 474-8106
LOS ANGELES ..... (213) 278-4117
MINNEAPOLIS ..... (612) 884-9980
NEW JERSEY ..... (201) 635-1092
N.Y. FINANCIAL DISTRICT ..... (212) 747-0220
ST. LOUIS ..... (314) 434-6330
SAN FRANCISCO ..... (415) 383-4111
WASHINGTON, D.C. ..... (202) 656-8676

International Offices

LONDON 01-222-4031
PARIS 331-775-0511
COLOGNE, GERMANY 221-763-1458

Corporate Headquarters
O.P.M. LEASING SERVICES, INC.
71 BROADWAY, NEW YORK, N.Y. 10006
(212) 747-0220
TWX: 710-581-5223 OPM LEASE/NYK

Short and Long Term Lease Plans Available

CPUs

- **370/135, 370/145, 370/155, 370/165** — All Configurations Available For Sale or Lease
- **303X Series** — Purchase/Leaseback of Installed or OPM Supplied
- **370/158, 370/168** — All Configurations Available For Sale or Lease
- **4300 Series** — All Configurations Available for Sale or Lease *"Subject to adherence to IBM's order certification process"*
- **370/138, 370/148** — All Configurations Available For Sale or Lease
- **Amdahl All Models, CDC Cyber 74, Univac 1100 Series** — All Configurations Available For Sale or Lease

FEATURES/MEMORY

- **370/158 & 168 ISC/Madrids All Channels** — For Sale or Lease
- **IBM Memory: 370/158s, 168s, etc. or 3000 Series Machines** — For Sale or Lease
- **OEM Memory: 155s, 158s, 168s, either EM&M, NSC, Intel or STC** — For Sale or Lease

PERIPHERALS

- **3333/3330s, 3350s, 3830s** — All Configurations Available For Sale or Lease
- **3803 Controllers, 3420 Tapes** — All Models and Configurations Available For Sale or Lease
- **3211/3811, 1403/2821** — All Configurations Available For Sale or Lease

Complete Installation and Planning Support Provided

▫DATA GENERAL▫ ▫DEC▫

SURPLUS SPECIALS

DATA GENERAL		DEC
NOVA* 4/X NOVA 3/D NOVA 1200 NOVA 2/10 ECLIPSE* S/230 ECLIPSE C/330	CPU'S	PDP 8 11/03 11/04 11/05 11/34A 11/45
NOVA ECLIPSE	MEMORY	MM8EJ MM8AB MS11DP MS11JP MS11LB MS11LD
6070-N 30 MEG SUBSYSTEM 6046 10 MEG DRIVES 6030 DUAL FLOPPIES 6060-A 80 MEG	DISKS	RX8BA RK05 RK8E RL01 RP02 RP03 RP04 RP06 RM02 RM03
6026 800/1600 BPI 6026-A SLAVE UNIT	MAGNETIC TAPES	TM811BA TM811EA
4251 COMMUNICATIONS CHASSIS 4204 SYNC. LINE MUX 4250 DCU 50 4250 ALM 4	COMMUNICATIONS	DZ11 DH11
6053 CRT'S, D-100 6012 CRT'S, D-200	TERMINALS	VT52 LA180 VT100 LA36

BUYING OR SELLING, CALL:
•DEC - Bryan Eustace 305-272-2338
•DATA GENERAL - Phil Thomas 305-272-2339

Thomas Business Systems, Inc.

DEC COMPUTER SYSTEMS AND COMPONENTS

RK06, RK07, RM03, VAX 11/780, 11/70, 11/34A SYSTEMS

C.D. SMITH & ASSOC. INC.
12905 EAST FREEWAY, SUITE 310
HOUSTON, TEXAS 77015
713/451-3112
TELEX: 76-2547 CD Smith Hou

USED DEC

PDP 11 PERIPHERALS AND SYSTEMS

NORDATA
CALL MARILYN
(206) 282-1170

Short or Long Term Leases From RANDOLPH

4300's
303X

...and all 370 CPU's and peripherals

800-243-5307

Randolph Computer Company
Division of The Bank of Boston
537 Steamboat Rd., Greenwich, Ct 06830
(203) 661-4200

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

DEC

Specialists in DEC Systems and DEC Compatible Add-Ons

DRP06-200MB	$14,995	DRWM05-300MB	$25,995
DRJP06-200MB	$21,995	DZ11's-Many-From	$ 1,495
DRWP06-200MB	$23,995	128KB MOS	$ 2,395
DRM02-3-80MB	$ 8,995	256KB MOS	$ 3,995
DRJM02-80MB	$15,995	DTU45 & Controller	$ 9,995
DRWM03-80MB	$17,995	M7850-Many	$ 595
DRM04-5-300MB	$16,995	Systems-Many-34-70's	
DRJM04-300MB	$23,995		

DATA SYSTEMS SERVICES
22642 Lambert
Suite 408
El Toro, CA 92630
(714) 770-8024
Buy-Sell-Lease

BUY • SELL • LEASE

370/115
370/125
Call John Ferguson

370/135
370/138
Call Mike Nelson

370/145
370/148
Call Ken Bouldin

S/3
MODEL 8
MODEL 10
MODEL 12
Call Roger Odom

MODEL 15
Call Jack Goodman

3742
Call Gayle Drotar

S/34
Call Roger Odom
IBM Maintenance Guaranteed

TAPE
3411·3410
3420
DISK
3340·3344
3350
Call Bob Ford

ECONOCOM
1755 Lynnfield Road
P.O. Box 17825
Memphis, Tennessee 38117
901-767-9130
Member: CDA

For lease

IBM 4331
1 MEG
August 1980 availability

MDFC
MCDONNELL DOUGLAS FINANCE CORPORATION
3855 LAKEWOOD BOULEVARD, LONG BEACH, CALIFORNIA 90846 213-593-8471

REGIONAL OFFICES

5745 N. East River Road
Suite 285
Chicago, IL 60631
(312) 693-2270

405 Lexington Avenue
Suite 4510
New York, NY 10017
(212) 682-1515

100 Pine Street
Suite 1850
San Francisco, CA 94111
(415) 956-3528

A SUBSIDIARY OF MCDONNELL DOUGLAS

- BUY
- SELL
- LEASE

TexCom
A Computer Leasing Company specializing in IBM General Systems Products

3
34 → NEW or USED!
38 → m/562's-w/3370's available in SEPT/OCT/NOV/DEC
4300

- 3741'S
- 3742'S

AVAILABLE FOR LEASE

TexCom offers Leases at prices' less than IBM's Lease-Price. We also offer a Purchase Lease-Back plan for your installed equipment.

CALL FOR A QUOTE!

• 1-800-531-5805 • 512-690-8826 in Texas

4200 Gardendale
Suite 100
San Antonio, Texas
78229

SPECIAL DEC SALE

MEMORY		TERMINALS & PRINTERS	
MS11LD — 256kb 11/34 MOS	$ 6,900.	VT100AA	$1,800.
MS11JP — 32kb 11/34 MOS	$ 800.	LA120AA	$2,350.
MM11DP — 32kb 11/34 core	$ 800.	LA180PA	$1,600.*
MK11BE — 128kb 11/70 MOS	$ 9,600.	LA36CE	$1,695.
MJ11BE — 128kb 11/70 core	$10,400.	LA34DA	$ 995.
MJ11BA — Frame & 128kb core	$16,900.	LP11VA	$8,900.

DISKS & TAPES		MODULES & INTERFACES	
RL11AK — Drive & Control	$ 5,250.	BA11KE	$3,000.
RL01AA — Drive	$ 3,950.	BA11MA	$1,400.
RL11 — Controller only	$ 1,850.	H960CA	$1,675.
RK611 Controller & Drive	$ 8,500.	FP11A	$3,100.
RP04AA 88 MB Drive	$15,900.*	KK11A	$4,150.
RM03AA 67 MB Drive	$17,900.	KE11E	$1,700.
RH11 Unibus Controller	$ 3,500.	DB11A	$1,700.
RH70 Mass Bus Controller	$ 4,500.	DQ11AB	$2,250.
TJU16EA Tape & Controller	$13,900.*	DL11W	$ 820.
TM11EA Tape & Controller	$ 7,900.*	DR11K	$ 780.
RX211 Controller & Floppy	$ 3,990.	M9312	$ 860.

*used

DATALEASE
The DEC Specialists

800-854-0350
IN CALIF.
714-632-6986

2770 REGAL PARK DR.,
ANAHEIM, CALIF. 92806

All equipment subject to prior sale, prices quoted are CASH or C.O.D.

DEC-10 EQUIPMENT FOR SALE

CALL FOR FURTHER INFORMATION:

TYMSHARE, INC.
EQUIPMENT SUPPORT DIVISION
Warren Caggiano 213-537-6500
Ike Cabase 408-446-6672
Dick Duval 408-446-7233

We have the following equipment available for quick delivery:

LP100 NEW Equivalent w/Controller and 12 Channel VFU	$39,850
RH10 USED Disc Channel	$14,500
MF10 USED 64K Word Memory	$ 9,500
MG10 USED 128K Word Memory	$29,500
MH10 USED 256K Word Memory	$59,500

Other DEC-10 equipment available at reasonable prices.

TYMSHARE

WANTED!
ALL
NCR
MINICOMPUTER EQUIPMENT
250, 299, 399, 499, 775, 7200, 7750 & 8200s

SMITH ANDERSON CORP.
68-757 SUMMIT DR.
CATHEDRAL CITY, CA 92234
(714) 346-3227

FOR SALE

IBM 370/165 KJ

Dat - 3 meg. of IBM memory
one 2880-2
one 2860, 2 channels
one 2870
Available mid-July 1980
Contact: **Mr. M.K. Randall**
(414) 277-2033
Wisconsin Electric Power Co.
231 W. Michigan Street
Milwaukee, WI 53201

Buy • Sell • Lease

3 32 34 38

All IBM Peripherals

CALL COLLECT! 901/372-2622
COMPUTER BROKERS, INC.
2978 Shelby St. • Memphis, Tennessee 38134

GROWING FASTER TO SERVE YOU BETTER!
FOR LEASE
LONG OR SHORT TERM
SYSTEM 32s & 34s
CRTs, CONTROLLERS,
5251 MODELS 11 & 12
METROPLEX COMPUTER COMPANY, INC.
7135 John Carpenter Freeway
P. O. Box 47220, Dallas, Texas 75247
(214) 634-2750 MEMBER CPI
TWX: 910-861-4171

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

Series/1

Discounts

- Equipment 5%
- Maintenance 15%

All new from IBM.
Attractive lease plans.

DATALEASE CORPORATION
The IBM small systems financing specialists.
Westport, CT • (203) 226-9582
Cumberland, RI • (401) 333-0240
Atlanta, GA • (404) 455-1480
Marlton, NJ • (609) 983-0936

Inflation Fighters

Quality & Savings

Slightly used, Money Back Guarantee. Full Reels. All External Labels Removed Guaranteed for use at 1600 BPI through 6250 BPI.

2400' Reel	$4.95 ea.
1200' Reel	$4.25 ea.
600' Reel	$3.50 ea.

All Tapes with Hanging Seals
We pay freight on orders over 200 tapes
All orders shipped within 48 hours
Call or Write

Computer Tape Mart
169 B New Highway
Amityville, New York 11701
[516] 842-8512

DEC EQUIPMENT FOR SALE

RP06 RP05 RP04 RM03 RM02
RK07 RK06 RK05 RL02 RL01

Controllers available for VAX, 11/70 and other PDP-11s.

Processors:	11/70, 11/60, 11/45, 11/34,11/23
Memory:	MK11-BE, MK11-CE, MS11-LD, MS11-LB
Tape:	TWE16, TU10
Printers:	LP11, LA180
Terminals:	VT100, VT52, LA120, LA36
Comm:	DZ11-A, DH11-AD
Card Rdr/Pun:	CT811-KM
Backplanes:	DD11-DK, DD11-CK

Carl R. Boehme & Assoc., Inc.
Specialists in Digital Engineering
408/727-3988

COMDISCO®

Your First Choice In The Second Market

IBM PROCESSORS

- ☐ 4331 — Systems available now
- ☐ 3135 — Any configuration
- ☐ 3138 — Immediate Sale or Lease
- ☐ 3145 — One Meg Systems
- ☐ 3148 — Short term Lease
- ☐ 4341 — Systems for Lease w/3370
- ☐ 3155 — 2 Meg Model II now
- ☐ 3158 — All sizes — short term leases
- ☐ 3165 — Best Price Performance
- ☐ 3168 — 4 Meg available now
- ☐ 3031 — Lease or Sale
- ☐ 3032 — 6 Meg for Lease
- ☐ 3033 — U or N Models
- ☐ 470 — V6-II available now
- ☐ 2880-2 — Lease or Sale
- ☐ Memory — IBM or Independent Call Rosemary Geisler, 312/698-3000

IBM PERIPHERALS

- ☐ 3330/40 — Available Sale or Lease
- ☐ 3350 — Wanted to Buy
- ☐ 3420 — Models 3, 4, 5, 6, 7, 8 immediate delivery
- ☐ 3880 — 4 Channel Switch machines immediate availability. Sale or Lease

IBM ETC.

- ☐ 3704/05 — Immediate delivery Karen Johns, 312/698-3000
- ☐ 327X — Call John Christopher, 312/698-3000
- ☐ Features — Most features available from inventory

We Can Put It Together

Branch Offices
Domestic

Atlanta	404/256-5956
Boston	617/542-4005
Chicago	312/698-3000
Connecticut	203/853-6966
Fort Worth	817/534-1774
Los Angeles	213/641-5100
Michigan	313/644-1500
New Jersey	201/568-9866
San Francisco	415/944-1111
Washington, D.C.	301/441-1000

International

Latin America (Florida)	305/266-5662
Montreal	514/747-4729
Toronto	416/498-7220
Paris	297 2000
Switzerland	021/71 09 35
West Germany	040/522 30 55

Corporate Headquarters
Comdisco, Inc.
6400 Shafer Court
Rosemont, IL 60018
312/698-3000
TWX — 910-253-1233

FOR LEASE

4331
GROUP 2

Delivery Dec./'80

PERIPHERALS AVAILABLE

Computer Merchants inc
75 South Greeley Avenue Chappaqua, New York 10514
Member Computer Dealers Association (914) 238 9631

FOR SALE
TWO DEC PDP 11/34

1) PDP 11/34; 250 KB mgs, 2 - RK05 disks and controller, 1 - TM811 tape, 2 - H9602 cabinets, 1 - BA11 KE expansion box, 1 - RSTS/E V7.0 class D, 1 - VT50 CRT, 1 - LA 120 printer. $35,000 or offer. Available July 15.
2) PDP 11/34-NE: 128 KB core, KY11 console, 1 - H960 CA cabinet, 1 - DH11-AE without modem control, 1 - RL11 AK disk and controller, 1 BA11 KE expansion box, 1 - M7850 party control. Best offer. Available Oct. 1980.
3) New Plessey DZ11E 16 line, $2500.
4) New RKDT disk and controller and on right warranty.

Advanced Control Systems
1900 Berkshire
Minneapolis, Minn. 55441
612/559-4122

4341—L

Sept and Dec 1980

CENTRON-DPL
612-884-3366

---

dc **dearborn** computer company dc

Giveth:

- 3203-5 printers below IBM, available immediately!
- 3211/3811 printer, available July.
- 3168-A37, available August.
- decision data printer 6603-11 300 lpm.
- 1 x 8 calcomp 215 dual-density drives available August.
- 1442-N2 card punch available immediately!

Call: Harry Kelso or Ira Levy

Taketh

dc **dearborn** computer company

1420 Renaissance Drive Suite 400 Park Ridge, Illinois 60068
(312) 827-9200/telex: 28-2482

DEC NOW

11/34A-LE64KB, DL11, KY11	NEW
Vax Systems	CALL
11/23AA or Datasystems	NOW
11/04, RL01 System	$19,000
11/34 systems	NOW
11/70 W/RP06's or RM03's New and Used	NOW
Peripherals, disc tape, and boards	
VT100	$1,900.00

WANTED FOR CASH
any and all DEC systems and peripherals.
All inquiries immediately answered

DATAWARE SYSTEMS LEASE, INC.
30 Bay St.
Staten Island, N.Y. 10301
(212) 447-4011
Telex 429394

DEC VAX SYSTEMS MEMORIES AND PERIPHERALS

IMMEDIATE AND SHORT TERM DELIVERIES

call:
BROOKVALE ASSOCIATES
800/645-1167 516/567-7777

SWA South West Automation

AVAILABLE NOW
11/34-A Systems — New & Used

(13)	VT100's	2000 ea.
(15)	H960-CA	1600 ea.
(1)	LA 180 printer	2000 ea.
(1)	M7258 controller	600ea.
(1)	PDT-150/w VT 100	8500 ea.
(4)	PDP 11/03w/RX01	7000 ea.
(1)	Data Genrl. Micro/Nova	6000 ea.
(4)	DZ11 A	2350 ea.
(10)	MS11JP	900 ea.
(1)	PDP 11/03w/RK F&J	12500 ea.
(15)	BA11KE	3000 ea.
(20)	DD11CK	420 ea.
(5)	DD11CF	420 ea.
(7)	KE11E	1200 ea.
(2)	TWE16 Tape Drive	16000 ea.

MANY OTHER MISC. ITEMS

HOME OFFICE
1113 Ave. B — P. O. Box M
Katy, Texas 77449
(713)371-8288

WEST COAST OFFICE
1175 Tasman Drive
Sunnyvale, Calif. 94086
(408)734-1117

BUY•SELL•LEASE

3741 3742
029 I.B.M. 129

WILLIAM MARION COMPANY, INC.
P.O. BOX 309, HACKENSACK, N.J. 07602
CALL (201) 343-4554

Buy • Sell • Lease SYSTEM 3

Call collect: 404 - 252-7480

IBM 34 or write.

32

DATAMARC
6065 Roswell Road
Suite 320
Atlanta, GA 30328

Contact: Bernie Gest
(215) 782-1010
7704 Seminole Ave.
Melrose Park, Pa. 19126

Computer Marketing Inc.

IMMEDIATE DELIVERY

3274-1C CONTROLLER
3211 PRINTERS
3203-2, 4, 5 PRINTERS
3274 / 3276 / 3278's

WANTED DASD

3340-3344-3350-3370

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

DEC

OR EQUIVALENT

HAVE IT YOUR WAY

SYSTEMS AND PERIPHERALS

(408) 732-4523

WEX West Coast Computer Exchange, Inc.

248 Sobrante Way, Sunnyvale, CA 94086

DEC LSI-11 Components

Dependable service at discount prices

Domestic and Export

Mini Computer Suppliers, Inc.

25 Chatham Rd., Summit, N.J. 07901

Since 1973

(201) 277-0150 Telex 13-6476

IBM

3270

PRINTERS, TERMINALS & CONTROLLERS

Please Call: (312) 943-3770

Forsythe/McArthur Associates Inc.

919 North Michigan Avenue

Chicago, Illinois 60611

COMPUCOM

DEC PDP11 EQUIPMENT AVAILABLE

SYSTEMS
VAX 11/780
11/70 RSX11-M
11/70 RSTS
11/34 RSX11-M
11/23 RT11
11/45 RSTS

PROCESSORS
11/15
8/E
11/40
11/04
11/34
11/45
11/70

CONTROLLERS
RH11
RH70
RP11
RK11
LEB
KL8-JA

DISK
RP02
RPR02
RP03
RP04-AA
RP04-BA
RWP04
RJP04
RK05F
RK05J
RF/RS11

RM03
RWM03
DM323
CD 266

TAPE
TJE16
TWE16
TU45
TU10
TU55
TU56

PRINTERS
LP11-VA
1403 N1 W PDP11 Controller
Centronics 101
Data Printer 600 lpm

COMMUNICATIONS
DQ11-DA
DC11-A
DJ11
DZ11's

CABINETS
H960
H961
H987

CARD EQUIPMENT
CR11A
CR11B

MEMORY
MF11
MM11
MS11JP

TERMINALS
VT05
VT50
VT52
LA36
LA120

MISCELLANEOUS
BB11
BA11-E
DA11-A
DB11-A
DB11-B
DP11-A
DR11-A
DD11-J
H312A
KA11-YA
KJ11A
M847-YA
PDP8I
RP03 Disk Packs
RP04 Disk Packs
H720-E
Sigma 6
HP 2866 A
DD11-PK
Miscellaneous Modules

COMPUCOM INC.
3402 OAKCLIFF RD., B-7 ATLANTA, GEORGIA 30340
(404) 452-1090

IDS international data services, inc.

DEC SYSTEMS

PDP 11/70's, 11/34's, 11/04's, 11/03's & Peripherals

BUY & SELL

(408) 738-3368 telex 345 592

1020 Stewart Drive Sunnyvale, CA 94086

DATA GENERAL SPECIALISTS FOR

Surplus New & Used Equipment & Systems with full depot repair facilities.

CALL US
WE TAKE THE TIME.
— WE CARE —

JM Associates

601 W. Chapel Avenue — Cherry Hill, NJ 08002

609-663-1115

BUY • SELL • LEASE • TRADE

Systems 3/32/34/38

CALL FOR A QUOTE.

(612) 333-6476

NORTHERN GROUP LTD, INC.

2124 ISS CENTER MINNEAPOLIS, MN 55402

System 34's 3 year leases below IBM

DEC MEMORY

64KB — $600
128KB — $1200
256KB — $2400
512KB — $4800

Your choice, one price:

- Q-BUS
- UNIBUS
- VAX

Terms, cash in advance. Delivery 15 days A.R.O.
Offer good through Aug. 30, 1980.

Call Bea Ramos 1-800-538-8510
In California 408/736-6876
NATIONAL SEMICONDUCTOR CORP.

FEDERATED CONSULTANTS

Specializing in

PDP8 & DATA SYSTEM 310
PDP8-A 400/BM/8KW $2,900
PDP8-E/16KW semi $3,600
PDP8-M/8KW semi $2,750
PDP8-F/16/KW core $2,900
100'S OF OPTION MODULES AVAILABLE

BRIER SPIVEY
214-428-5300 hot line
214-278-4031 — purchasing
214-421-1181 — answering service

WE BUY, SELL, AND INSTALL

NEW AND USED COMPUTER ROOM FLOORING

Raised Floor Installation, Inc.
19 Sebago St.
Clifton, N.J. 07013
(201) 778-2444 in New Jersey
(212) 594-4039 in New York
(415) 546-9466 in California

SCG

WE WANT TO BUY

3830-2
3830-2
3350 A2F
3350 B2
3330-11

2150 - 2151 - 6111 - 8170 - 8171
2150 - 2151 - 6111
8150

ALL ABOVE REQUIRED BY AUGUST 10,1980

CALL:

CHICAGO
312/433-0460
Tom Millunchick

STAMFORD
203/324-9495
Larry Goichman

STAMFORD COMPUTER GROUP, INC.

REPLACE YOUR IBM

3830's (1&2), 3330's & 3333's (1&11) with

MEMOREX UNITS

3672 Storage Control Units
3673 Disc Controllers
3675 Disc Modules

AVAILABLE IMMEDIATELY: LEASE OR SALE
Contact: Harry Blair 713/524-8249

WE BUY

158 & 168

MEMORY

transdata

214/631-5647

BUY — SELL — LEASE — BROKERAGE

Let the "NATIONS LARGEST WHOLESALE DEALER"

Buy, sell, lease, sub-lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units

COMPUTER INTERNATIONAL, LTD.
CWC's international division — experts in foreign markets, freight, customs

BEACH COMPUTER CORPORATION, CWC's Leasing Division

COMPUTER WHOLESALE CORP., (504) 581-7741
SUITE 507/508 FIRST NATIONAL BANK OF COMMERCE BLDG.
NEW ORLEANS, LOUISIANA 70112

MEMBER OF COMPUTER DEALERS ASSOCIATION

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

FOR SALE OR LEASE

SYSTEM 3 MODEL 15D

5415 D23, 4100, 4101, 4160, 4601, 4602, 8220, 5733, 4140.
Includes
1403-002, 3277-001, 3277-4632, 3340-A2, 5421-001 5424-A02
Available September 1980

For Information Contact:
Richard E. Reich
Medicare Data Services, Inc.
3 Romaine Road
Mountain Lakes, N.J 07046
(201) 334-1128

—FOR SALE—
Wang Computer System
- •2200T – 8 CPU
- •2226-B Video/KBD Console
- •2270 - 2 Dual Floppy
- •2281 Diablo Daisy Printer
- •2261W Dot Matrix Ptr., 240 LPM
- •2228 RS 232 I/O

Available September 1, 1980
Asking 16K
Contact Harold Stein
CFR Associates, Inc.
18 Granite St. Haverhill, Ma. 01830
617/372-8536

DEC 11/34

BUY • SELL • SWAP

INSTANT RESPONSE: (617) 261-1100

AMERICAN USED COMPUTER
P.O. BOX 68, KENMORE STATION, BOSTON, MASSACHUSETTS 02215

FOR SALE

TANDEM SYSTEM

2 CPU's, 480 KB each
280 MB controller & disk
800/1600 BPI tape drive & controller
Line Printer - 600 LPM & controller

Best offer.
Principles only.
Available immediately.
Contact
Mr. Don Bitto
215/265-7600, ext. 537

AVAILABLE

4331 Model 2
10/17/80

RANDOLPH
Computer Company
Division of The Bank of Boston
537 Steamboat Road
Greenwich, Ct. 06830
800-243-5307
(In Connecticut, 661-4200)
Member
Computer Lessors Association

SHORT TERM LEASES
138's, /148's, /158's, /145's
3330's, 3350's, 3420's
360/40's, /50's, /65's
Call Us Collect

UNITED STATES	
Boston: Eastern Regional Headquarters	**(617) 272-8110**
Arlington	(703) 521-0300
New York	(212) 832-2622
Philadelphia	(215) 293-0546
Austin: Southern Regional Headquarters	**(512) 451-0121**
Atlanta	(404) 768-6535
Dallas	(214) 233-1818
Houston	(713) 447-0325
Chicago: Central Regional Headquarters	**(312) 298-3910**
Pittsburgh	(412) 922-8920
Detroit	(313) 961-1675
Minneapolis	(612) 370-1153
St. Louis	(314) 353-8285
San Francisco:	
Western Regional Headquarters	**(415) 283-8980**
Los Angeles	(213) 670-7994
CANADA	
Toronto	**(416) 366-1513**

BROKER/DEALER SALES AND LEASING

Chicago	(John O'Shea)	**(312) 298-3910**
Dallas	(Bill Tucker)	**(214) 233-1818**
New York	(Richard Ventola)	**(212) 832-2622**
San Francisco	(Henry Paulson)	**(415) 283-8980**

******NEED TO BUY******

ALL MODELS **S/34** **5251 5256 5211 3262**

Call Collect:
312/448-4300
Owens Computer Group, Inc.

FOR SALE
System 3 — Model 15D
System 3 — Model 10
System 32
System 34

URS *Since 1969*
Call: Bob Luck
(617) 438-4300
66 Montvale Ave.
Stoneham, MA 02180

GREYHOUND COMPUTER CORPORATION
800-528-6113
Greyhound Tower Phoenix, Arizona 85077

Data General • DEC
Buy — Sell — Trade — Repair

(30) Unused DEC MS11 JP, 32KB, Mos. ..... $550 each
New & used DG 6045 disk drives & controllers ..... Stock
(5) New DG 6053 terminals ..... $1900 each
New DG 4X, 4C, 4B, 3/12 CPU's or Systems ..... Stock
(150) New VT 100 terminals ..... $1725 each
New and Used D.G. Mos and Core Memories
DG peripheral and board repair service now available.

Computer Resale Consulting, Inc.
490 W. Main St., Avon, MA 02322
Call George Trawinski (617) 583-6360

3880's
AVAILABLE NOW
SALE OR LEASE

NF COMPUTER SALES & LEASING CORP.
1211 W. 22nd St., Suite 424
Oakbrook, IL 60521
Telephone 312/920-8181
Telex 206106 NFC OAKR

11/70 & 11/34
Intergrated, Installed, Fully warranted.
Immediate Availability
Call Nordata, 206/282-1170

BUYING • SELLING • LEASING • RENTING • UPGRADING • IBM OEM

SUN DATA

Sun Data can't give you a better offer if you don't give us a call!

We're Specialists In Packaging Systems
3/32/34/38
And Peripherals.

Try our MAINTENEX: Keep your present service by IBM but at up to 20% savings.

6185 S. Buford Hwy
P.O. Box 105046
Atlanta, Georgia 30348
CALL TOLL-FREE **800-241-9882**
In Georgia Call Collect 404-449-6116

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

DEC SPECIAL

DATA SYSTEMS FROM STOCK!!!! **ALL UNUSED 60hz and 50hz**

DS 323 (11/03 processor)

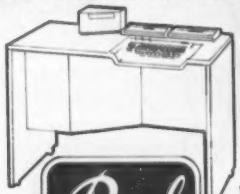
Including:
56Kb Memory
RXV21-BA dual floppy disc
H9642 cabinet
VT100-NA CRT
LaVii PA LA180 printer and control
CTS 300 - Software Licers

OPTION AVAILABLE:
RL01's LA120's KDF11's
RL02's DLVaa-J.CF upgraded to 11/23

PRICE: Everything discounted
Additional quantity discounts available
DELIVERY: Immediate

DATAWARE
SYSTEMS LEASE, INC.
30 Bay St.
Staten Island, N.Y. 10301
(212) 447-4911
Telex 429394

We have available many IBM 3740 Systems



Pearl EQUIPMENT CO., INC.

We buy & sell
•IMMEDIATE DELIVERY
•SHORT AND LONG TERM LEASES
•PURCHASE / LEASE BACK PLANS
WE •BUY •SELL •LEASE •System/34 •System/36
CALL: •STEVE HOUGH •DICK GEYER

PEARL EQUIPMENT COMPANY, INC.
P.O. BOX 24029 • 4717 CENTENNIAL BLVD. • (615) 385-6703 • NASHVILLE, TN 37202

BUY
SELL
RENT
TRADE

FAST DELIVERIES
REASONABLE PRICES
FULLY WARRANTEED
RESPONSIVE SERVICE

dec

OLDIES BUT GOODIES

BA11-ES	Expansion Box
LS11-A	60lpm Printer
RPR11-AA	20Mb Dr/Cont
RPR02-AM	20Mb Add-on Dr
RP11-CE	40Mb Dr/Cont
RP03-AS	40Mb Add-on Dr
RK11-AA	2.5Mb Dr/RK11C
TC11-GA	TU56 DECtape

BROOKVALE ASSOCIATES
(800) 645-1167
N.Y. (516) 567-7777
40 Orville Drive
Bohemia, N.Y. 11716

3270's

AVAILABLE FOR SALE OR LEASE

3271/3272 CONTROLLERS
3277 DISPLAY STATIONS
3284/3286/3288 PRINTERS
3274 CONTROLLERS
3278 DISPLAY STATIONS
3287/3289 PRINTERS

NF COMPUTER SALES & LEASING CORP.
1211 W.22nd St., Suite 424, Oak Brook, Il. 60521
Telephone 312-920-8181, Telex 206106 NFC OAKR

WM&F
Western Marketing and Financial
200 Gate 5 Road, Suite 201 • Sausalito, California 94965 • (415) 332-8460

FOR SALE OR LEASE

4341/L	P.O.# 3980NY	8/15/80
4341/L		12/19/80
3880 w/8170 & 8171	P.O.# 3991HU	7/25/80
3880 w/8170 & 8171	P.O.# 3980OR	8/15/80
4331/J	P.O.# 3972EQ	10/17/80
3031/5	All IBM	10/15/80

CALL JACK AIR OR HILDI GUTMAN
415/332-8460

UNIVAC 90/30 SUBLEASE LARGE DISCOUNT

Available from User
Includes:
164K Memory
(4) U200 Terminals
(4) 8418 Disks
(2) U10 Tapes
717 Reader
719 Punch
776 Printer
Communications Adaptor
October 15 DELIVERY
Send inquiries to:
Consultron
927 Pershing Drive
Silver Spring, Md. 20910
(301) 589-8834

FOR SALE 2944-1 2944-2 IBM Channel Extenders

contact
R. Mikkor
University Of Toronto
Computing Services
(416) 978-5058

FOR SALE
DEC RWP04
disk system with RH70 controller.
DEC maintained
Contact
Al Ayres at 206-682-8482.

Want-to-Buy DEC 11/04 CPU/SYSTEM

Please Call Howard
617-261-1105

IBM 158 APU
Available Sept. 30, 1980

Contact: Jerry A. Boriay
(303) 988-0820

JBI Associates, Inc.
12973 West 3rd Place
Lakewood, CO 80228

Member:
Computer Dealers Assoc.

BUY&SELL

370 Peripherals
Will Buy IBM Rental Equipment
All Data Entry Equipment
System 3, 34 & 38

Vantage
Computer Marketing, Inc.
2460 Southwell
Dallas, Texas 75229
214/620-8380
TWX 910-860-5060

BUY SELL LEASE

SYSTEM 3-32-34-38 SERIES 1-5110

Available: S/34-E35-E34-C23-C24-D35
5251-11, 5251-12, 5256-03

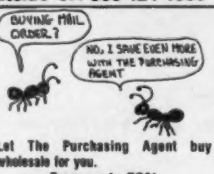
Communication:
3271, 3272, 3277, 3284
3284, 3286, 3288, 3776
3777, 3780, 3704, 3705

Peripherals:
3741, 3742, 129, 029, 059
3715, 3717, 083, 514, 548
3410, 3411, 3340, 3344

GENE NICHOLL
TOM KLEEFISCH
AMERITEX COMPUTER CORP.
8383 N. Stemmons Frwy., Suite 302
Dallas, TX 75247 214/631-3116
Formerly Gemini Computer Corp. and Computer Resources Ltd.

Texas Instruments 765 Bubble Memory Terminals

We Are Overstocked **MUST SELL**
LOWEST PRICE In U.S.A. Available Now
data rentals/sales, inc.
213-559-3822 813-934-0829
Outside CA 800-421-4505 Outside FL 800-237-9863



Let The Purchasing Agent buy wholesale for you.
Save up to 50%
Over 200 computers, CRT's and printers plus software. Compare:

	Office	Where
TI-810 Printer	$1,303	TVI 912C $ 699
Cromemco Sys-3 64K	9,345	Diablo 1640 2,827
Qume 10-12F	699	Alpha Micro 10Meg 10,185
Qume Sprint 5	2,395	Zenith Z-89 48K 2,099
WordStar Ver2 32K	2,179	WordStar 250

THE PURCHASING AGENT
(415) 540-8119
Hotel Claremont, Berkeley, CA 94705

WANTED:
BURROUGHS NCR IBM FINANCIAL EQUIPMENT

TU1700, TU1800, DC140
TD700, TD800
L9000, TC3900

Wilson Business Machines, Inc.
24565 Hallwood Court
Farmington Hills, MI 48018
ATT.: JoAnne 313/478-7700

WALKAWAY LEASE IBM 3033-N8

Delivery October 1980
2 Years 90% of IBM MAC
Contact: Bob Russell
Bob Smith
SYSTEMS MARKETING, INC.
Phoenix, Arizona 85012
(602) 264-5800 Telex 667-334

For Sub-Lease
3031-3
18 Months
Availability 9/1/80
Contact: Dick Nelson
NELCO, LTD.
804/794-3009

FOR SALE:

AS IS AND WHERE IS

The Milwaukee Public Schools will receive sealed bids until 2:00 P.M., Friday, August 1,1980, for the sale of used computer equipment, including S/3700-148 Configuration, 3047/10784-001 Power Unit and a 7748-1-MB Intel Memory.

Bid forms can be obtained upon request at the Milwaukee Public Schools Purchasing Division, Rm. 160, 5225 W. Vliet Street, Milwaukee, Wisconsin, 53208. Telephone: (414) 475-8333

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

WE BUY, SELL, LEASE IBM®

SADDLEBACK MARKETING CORPORATION

1400 NORTH BRISTOL, SUITE 170
NEWPORT BEACH, CA 92660
PHONE: (714) 833-9900
TWX: 910-595-2550

FOR SALE

3420 Model B Tape Drives
3340 B2
3274 Model 1B, 3803 Model 1
3420 Model 5's, Model 7

For Sale

2401 V's
7SD & 4DD

2803 II's

Call Dean Nice
Computer Consultants Inc.
916/262-5777

FOR SALE
2 MICRODATA ROYALE SYSTEMS (LEVEL 3.0)

(1) 64K Memory
150 Meg Disc w/Controller
800 BPI Tape Drive

(2) 32K Memory
25 Meg Disc & Controller
800 BPI Tape Drive

Call or Write

Clifford A. Phillips
111 Port Jersey Boulevard
Jersey City, NJ 07305
201-435-3307

BUY SELL LEASE

370 PERIPHERALS	370 CPU's
Disk Printers	135/145/155
Tape I/O	138/148/158

6830	DATA ENTRY	UNIT RECORD
Sys. 32/34/38	37XX/5496	029/129
All Sys. 3	All 3200	083/557

DAC Buys Rental Credit Equipment
Call or Write

DATA AUTOMATION CO, INC.
4858 Cash Road
Dallas, Texas 75247
214 637-6570
Member of Computer Dealer Association

---

mpi MIDWEST PERIPHERALS, INC.
(312) 479-2080

- *DEALER AND LESSOR OF IBM PERIPHERALS
- *ALL EQUIPMENT QUALIFIES FOR IBM MAINTENANCE
- *ALL EQUIPMENT COSMETICALLY REFURBISHED PRIOR TO INSTALLATION
- *COORDINATION OF SHIPMENT AND INSTALLATION
- *PURCHASE/LEASEBACK OF EXISTING EQUIPMENT
- *BUYER OF YOUR EXCESS DEVICES

"SPECIALIZING IN THE IBM PERIPHERAL MARKETPLACE"

104 NORTH WHITE STREET
FRANKFORT, ILLINOIS 60423

AVAILABLE NOW
12 to 24 month term
370/135 384K
I.P.A. - I.F.A.
and all channels now installed.
Will configure control storage to your needs.
$800 to $1300
per month net/net depending upon terms and final configuration.

CW Box 2342
375 Cochituate Rd., Rte. 30
Framingham, Mass. 01701

CASS CAN WHEN IBM WON'T

- **Save you thousands of dollars**
- **Deliver quickly**
- **Take trade-ins**

System/34, System/32, System/3, All peripherals and upgrades too.

Cass Marketing Services Inc., 535 N. Brand Blvd., Suite 838 Glendale, CA 91203 • (213) 956-4982

FOR SALE
3 new Genesis One CRT's
with Data Entry Keyboard
For details, call
(312) 977-7401

WANTED TO BUY
545
C. Zierke
312-282-9400
X340

FOR SALE
S/370-138 J00
3046
4620, 4722, 4655, 8075
Worth $45,000 after July 1, 1981 in trade on a 43XX
$85,000 or best offer
CW Box 2341
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

VT-100's
in stock
50 or 60 Hv

prc
Commercial Products Group
603/625-4750
3 Perimeter Rd.
Manchester, N.H. 03103

DEC 11/45 FOR SALE

RP04 (2) PACKS (7) TU10 (1), CORE (128KW)DZ11E (1) DD11-DK (1), DM11-DA (4) BA11KE (1)RSTS-E(D) DB11A (1) EL11E (1), LA36CA, (1)

UNDER DEC BMM SINCE NEW CPU #6825 AVAILABLE NOW

ALBRIGHT COLLEGE COMPUTER CENTER
Reading, Pa. 19603
215-921-2381 X 244

WANTED
Complete Univac 90/25, 30, or 40.
Will consider purchase, rental or lease.

Dept. CW
P.O. Box 277
New York, NY 10150

FOR SALE
IBM S/3
MODEL 8 DISK

16K CPU
9.6 MB 5444 DISK
2 Fixed
2 Removable

3741 Attached
3742 Dual Keypunch
5203 300 LPM Printer

System always under IBM maintenance
Available end of 1980

WILNER WOOD PRODUCTS, INC.
ALPINE ST.
NORWAY, MAINE 04268
ATTN: D. TILLEY
TELEPHONE (207) 743-6361

THIS SPACE FOR HIRE.

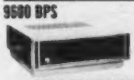
Direct from the Factory at Significant Savings • Fully Reconditioned • Fully Warranted

SAVE UP TO 66% of Original Purchase Price

MODEMS

For a Limited Time Only. Offer Subject to Availability of Product

Now you can buy or lease dependable Racal-Milgo Modems at a special low cost. We have a stock of modems, largely from customers who have upgraded their data communications networks with our latest modems. These modems have been factory tested, are under warranty, and are backed by Racal-Milgo's nationwide service/support organization. Quantities are limited. Prompt action can assure you of these substantial savings.

		Original Price	Special Price
Short Haul to 19,200 BPS **COM-LINK II**	Com-Link II is a special purpose modem offering the ability to transmit and receive synchronous data, at five switch selectable data rates of 2400, 4800, 7200, 9600 and 19,200 bits per second, over local hardwire facilities.	Purchase $975 Lease $35/mo.*	Purchase $625 Lease $20/mo.* Installment Purchase $23/mo.**
2400 BPS **24LSI**	24LSI is a highly reliable modem which transmits and receives full or half-duplex 2400 bps synchronous data over unconditioned, dedicated or dial-up lines.	Purchase $1585 Lease $44/mo.*	Purchase $849 Lease $29/mo.* Installment Purchase $32/mo.**
4800 BPS **4600/48**	4600/48 is a manually equalized modem. The 4600/48 transmits 4800 bps full duplex data over unconditioned lines. The modem also allows an operator at one location to test the full system, using a pseudo-random test data generator built into the modem.	Purchase $4750	Purchase $1595 Installment Purchase $59/mo.**
9600 BPS  **9600 MULTIMODE**	96 Multimode is a superior single and multiport 9600 bps modem. 96MM offers flexible multiport and can accommodate any combination of 2400, 4800 and 7200 bps channels, up to 9600 bps, with independently controlled carrier for each channel.	Purchase $8750 Lease $185/mo.*	Purchase $4995 Lease $133/mo.* Installment Purchase $186/mo.**

Prices apply to sale or lease in U.S only. * Based on 36 month lease. ** Based on 36 month installment/purchase

Racal-Milgo Special Offer Division, 8600 N.W. 41st St., Miami FL 33166
Reserve now. Phone collect (305) 591-5535 or send this form.

Racal-Milgo — the new name for ICC

I want more information about your Special Offer Division products.

☐ Please send order form and data sheet
☐ I'm interested in the following:

Product	Quantity

☐ Purchase ☐ Lease
☐ Installment Purchase
☐ Please place me on your mailing list

Name and Title
Company
Street
City State Zip
Phone No

CW 7/80

buy sell swap | buy sell swap | buy sell swap | buy sell swap | buy sell swap

FOR SALE NEW & USED

300 LPM
Data Printer Corporation Standard OEM Interface 64 Char, Chaintrain $2,950

5 MEGABYTE
OEM Caelus & Pertec Disc Drives, Removable ..... $ 900

40 MEGABYTE
Calcomp — Century Data OEM Disc Drives 50 or 60 Cycle $3,250

TYMSHARE INC.
10231 Bubb Road
Cupertino, CA 95014
or call:
Karen Newlin — 408 446 6945
EQUIPMENT SUPPORT DIVISION

TYMSHARE

11/70

512 KB MOS
(2) RM03
(2) TWE 16
DH11AD
Available Immediately

Intermetrics, Inc.
Call John Thompson
617-661-1840

STATE OF MISSISSIPPI
STATE BUILDING COMMISSION/STATE CENTRAL DATA PROCESSING AUTHORITY ADVERTISEMENT FOR BIDS

Sealed bids will be received at 508 Robert E. Lee Building, Jackson, MS, until 3:30 P.M., for the following data processing equipment and services:

Request for Proposal No. 578, due 3:30 P.M., Tuesday, August 19, 1980, for the acquisition of a mark sense reader for test scoring and analysis.

Request for Proposal No. 579, due 3:30 P.M., Tuesday August 19, 1980, for the acquisition of a microprocessor development system to be used in the design, debugging and emulation phases of target system development.

Bid documents may be obtained from:

Malinda Algee,
State Central Data Processing Authority
508 Robert E. Lee Building
Jackson, MS 39201
601/961-4312

Bid preparation will be in accordance with instructions to bidders in the request document. The State Building Commission or the Central Data Processing Authority reserves the right to waive irregularities and to reject any or all bids.

By: James Chastain, Executive Director, Building Commission
Frank C. Stebbins, Executive Director, CDPA

DX 10 SPOOLER

- Multiple Copies
- Prioritized Queue
- Multiple Printers
- Full Printer Control
- Form Name Designation
- Accessible by Program or thru SCI
- Enhanced System Utilization

FOR ALL YOUR TI NEEDS
SUN VALLEY SYSTEMS, INC. (602) 274-7555
4607A N. 12th Street Phoenix, Arizona 85014

SVS

SERIES/1
FOR SALE BY OWNER

QTY	ITEMS
2	4952-B Processor 96K - 9.3 MG Disk
1	4973-2 Line Printer 414 LPM
4	4978-1 Display Station

Under Continous IBM Maintenance

CALL
312/586-2600
EXT 3496
ASK FOR DON

DEC
AVAILABLE IMMEDIATELY

DISK DRIVES	CPU	OPTIONS	TERMINALS
RL01 RL02 RK06	11/23 11/34	DZ11 DH11	VT52 LA120
RK07 RP04 RP06	11/70	DR11 DL11	LA180

OTHER ITEMS IN STOCK. CALL FOR QUOTE.

NATIONAL COMPUTER EXCHANGE
2457 OAKLEAF CANYON ROAD, WALNUT, CA 91789
(714) 594-3006

For Sale
IBM 5100 COMPUTER

48K Memory
Aux. Tape Drive
120 CPS Printer
25 Tapes
Under IBM Maintenance
$5,000 or Best Offer

Contact:
Rob Roy
Jarvis Steel & Lumber Co., Inc.
Balto., Md.
1 (301) 355-3000

OWNER SELLING DEC 11/03
FULL SYSTEM WITH EXTRAS
CALL JOHN
212-582-4839

DEC
KI-10
READY FOR DELIVERY
$110,000
DEC MAINTAINED
ALSO
MEMORY, DISK & MEGTAPE
CONTACT OWNER
DAN NUSSDORFER
617-845-2660

DEC
FOR SALE

11/34 A (LH)	$11750.00
MJR BE	800.00
BHBAA	4500.00
DM11DC	975.00
DMIIBB	1150.00
MSIJP	850.00
RKDSF_J	MSILB
DLIAJE	DDHCK, DK
DZ8A	DBRA
M7258	DRHC
RM03	MKRCE
H860CA	LA180

Western Data Systems
213/375-0523
PO Box 7000-182
Redondo Beach, CA 90277

WANTED

Addresses of DOS/VS(E) users in U.S. and Canada by European Software House
CW Box 2343
375 Cochituate Rd., Rte. 30
Framingham, MA 01701

DEC Datasystem 358
PDP-1134A

256KB MOS Memory
2 RKO7 Drives and Controller (56MB)
DZ11-A 8-line Multiplexor
4 VT100's
180 CPS Printer
CTS-300 License

Available for lease with purchase option at very attractive monthly payment. One year old. Also available with CTS-500.
Call Jeff Vendetti at Accudata, 617-584-6500.

FOR LEASE
IBM 4341-L00

Delivery October, 1980
Lease Rate -
IBM MLC $7,987

Contact:
Bob Russell
Bob Smith

SYSTEMS MARKETING, INC.
200 E. Thomas Road
Phoenix, Arizona 85012
(602) 264-5600 Telex 667-334

SMI

FOR SALE
DEC Sys. D324

CTS 300 Operating Sys.
LS 1-11 CPU
VT 52 CRT
LA 180 Printer
Extra 8K Monolithic Mem.
Software: A/R, A/P Order Entry and G/L (including User Manuals).

Bids Close 8/15/80

Lincoln Lease/Way, Inc.
Jack Darr
One Lincoln First Square
Rochester, New York 14643
(716) 262-3710

DEC 11/34

160 KB Memory
2 VT 52
2 LA 180
RT11 & RSX11
8 Comm Line DZ11
RK05 & RX01

Available Immediately
CYBERNETICS
(305) 443-1651

SALE OR LEASE BY OWNER

PDP-8 System consisting of VT 78
Dual Density Floppy disk COS-310
LQP-78 Letter Quality Printer

Contact
Dan A. McGaffey
(617) 588-1200

For Sale By Owner
IBM SYSTEM 32

32 KB memory
13.7 MB disk
155 LPM printer
$14,500

Call Ed Stavenick
Republic Metal
201/376-7200

FOR SALE BY OWNER

DEC PDP-11 Equipment
1- RK05J Removable Disk
1- RK05F Fixed Head Disk
w/Controller & Cabinet

Call: **Allan Parker**
Flexcon Co., Inc.
Spencer, Ma.
Tel: **(617) 885-3973**

FOR SALE
DOCUMENTOR P.O.S. CASH REGISTERS

12 masters
[Model 3200]
with 36K and 24 remotes
[Model 3322]
Used less than 1 month
by a company we acquired.

Stan Vik
512-735-9392

TIME & SERVICES

FOR SALE
IBM SERIES I

49955-D	Processor & 32K Bytes Add Storage
4962-2	Disc Storage Unit
4973-1	Printer
4979-1	Display Station
4997-1B	Rack Enclosure

Immediately Available
Call Owner
(212) 483-9780

FOR SALE
BURROUGHS B3741

1 — B3741 Central Processor
20 Mil. Bytes Systems Disk
200 KB IC Memory
1 — B3342 Console
1 — B9243-11 Printer
3 — B9393-1 144KB Tape Drives
4 — B9485-3 Disk Drives
1 — B9116 Card Reader
1 — B9134-1 Reader/Sorter — 12 Pckt.
3 — B3667-5 Std. Async Adapter
1 — B3353 Basic Multi-Line Control
15 — TD801 CRT's

IMMEDIATE AVAILABILITY
MAKE OFFER

For additional information contact: **Roland Klein, Affiliated Computer Systems, Austin, Texas 78700 TEL: (512) 478-7667**

FOR SALE
MAI EQUIPMENT

402 - Accounting Machine
024 Keypunch Machine
083 - Sorter
087 - Collator
523 - Gang Punch
5222 - Cad unit.

Will sell all or seperate, Excellent Condition - under Sorbus Contract. Available September 1, 1980. Best offer, **contact Roger Smeltzer at Beckett Aviation Corporation.**
Phone (216) 746-8555.

FOR SALE
370/115-GF2
3203-01 Printer
3340-B2 DASD

Contact
C.W. McKellar
(401) 886-2220

THE BIG COMPUTER
AMDAHL 470/V8

- On-line & RJE time available
- OS/MVS — JES II — CICS — TSO — ROSCOE — APL
- SDLC or Bi-synch communications
- 24 hours — 7 days/week
- Technical & Programming Support
- Attractive rates/volume discounts

Contact Bill Davis
Network
Computing Corp.
Charlotte, N.C.
704/525-8810

WANG

For sale by owner:
2260C 10 MEG DISK DRIVE W/ PACK AND STAND and 22c03D DISK/DISKETTE CONTROLLER..... $9,500
FOUR 5 MEG DISK PACKS..... $80 each

Maintenance is current. Contact: **Dave Valentine, 2075 N. 6th Ave., Tucson, AZ 85705, (602) 624-7401.**

NO WAITING!
IMMEDIATE DELIVERY!
DEC® COMPATIBLE
Video Display Terminals
VT-100 and VT-52
TELETYPE® TERMINALS
MODEL 43 and MODEL 40
In Stock!
!! CALL TODAY !!
312-735-8200
BRONSON & BRATTON INC.
5161 South Millard Ave.
Chicago, IL 60632

FOR SALE
IBM 360-50-512K
2314 - A1

Available 8/15/80

Call:
Philip E. Jennings
617/929-6357

AVAILABLE FOR SUB-LEASE
IBM 3148-K

PROCESSOR & POWER UNIT
INCLUDES: 2150, 3621, 4660, 6111, 8075, 8076, 3047-001
SHORT TERM LEASE AVAILABLE
UNITS AVAILABLE AFTER AUGUST 1, 1980

CONTACT:
Rick Lehmann or Bill Freehour
Martin Marietta Data Systems
P.O. Box 5837 — MP 44
Orlando, FL 32855
305-855-1050

time & services | time & services | time & services | software for sale | software for sale

MEMORY & COMPUTER REPAIRS

ANY MANUFACTURER'S MEMORIES
CORE — SEMI
DEC® — DATA GENERAL
COMPLETE CPU'S AND MEMORIES

THREE DELTA CORP
1038 Kiel Court, Sunnyvale, CA 94086
(408) 734-2680
TWX-910 339-9511

COMPUTER REPAIRS

NOVA 1200, 2, 3
ALL BOARDS
CPU-MEMORY – I/O ETC.

MEMORIES AND POWER SUPPLIES
ANY MANUFACTURER

90 Day Warranty – 10 Day Turnaround

DIGITAL DATA SYSTEMS, Inc.
1396 N.W. 65 Terr. Plantation, FL 33313
Florida (305) 792-3290
Boston (617) 491-3859
Chicago (312) 475-4435
Philadelphia (215) 272-7442
OUR 8TH YEAR OF SERVICE

MINI-COMPUTER SYSTEMS, INC.
FIELD SERVICE

Maintenance Contracts available — Time & Material Calls
Installations — Spare Parts
Depot Repair Service

We specialize nationwide in the below products and more:
Data General Nova 2s & 3s Computers
Control Data
9448 CMD 32/64/96 MG Drives
9762 80MG SMD Drives
Data Printer Chain Printers
CT 2324-300 LPM
CT 6644-600 LPM
Printronix 300 LPM
Diablo 44A & 44B Disk Drives
Centronics 101, 501, 701-703 Series
MCS can provide your company with the level of support it needs or your customers require. For Price quotes and additional information; please call **(914) 592-8812 ext. 207; National Field Service Manager.**

BROKERS OF COMPUTER TIME

N.Y. Metro Area Only
Computer Reserves, Inc.
(212) 599-0770
(201) 676-1881

FAST DEPENDABLE BOARD REPAIR

Data General — **Interdata**
DEC — **Computer Automation**
Data Products — **Diablo/CDC**

- 7 DAY TURN-AROUND
- "RACE" (24 hour) SERVICE
- 60 DAY FULL BOARD WARRANTY

MMI MINI-MAINTENANCE, INC.
3020 LINCOLN CT., GARLAND, (DALLAS) TEXAS 75041
1-800-527-4541 TWX 910 860-5088
CONTACT: CHUCK MITCHELL

Computer Time For Lease.
Attractive Rates

IBM 360/30 65K
4 2401 II TD
4 2311 DD
2 Calcomp Plotters
1 1401 Compat Feature

Henderson and Bodwell
120 Express Street
Plainview, New York 11803
(516) 935-8870

MCC Maritime Computer Corporation

370/145 — 4331
- DOS/VSE
- RJE
- CICS
- GRASP

Time Available All Shifts

Cranford, N.J. — San Francisco
201—272-3500 — 415—982-2323
Don Radigan — Tom Marino

Computer Services

370/158-3
VS1 - CMS - DOS
REMOTE JOB ENTRY
INTERACTIVE COMPUTING
TURNKEY SYSTEMS
PACKAGED PROGRAMS
(201) 777-3454
15 Minutes from Lincoln Tunnel
One Passaic Street
Wood-Ridge, N.J. 07075

370/168 mod 3 Datacenter

4.0 meg MVS
Specializing in
Remote Job Entry
TSO, CICS, and Batch
IBM 3800 Laser Printer
Very Attractive Rates
Contact: Stu Kerievsky
(212) 564-3030
Datamor
132 West 31 St.
New York, N.Y. 10001

TIME & SERVICES

PDP-11/70 Timesharing

- RSTS/E
- DIBOL/BASIC-PLUS
- Best rates in Boston
- No charge for CPU time
- Word Processing available
- Local Boston Dial-up lines
- Business packages available

Call Jeff Vendetti at Accudata, (617)-564-6500

I.B.M. 360-40

All Shifts, 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility.

From $35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036
Contact:
Al Palmo (212) 997-1413
Charles Leigey (212) 997-1411

COMPUTER TIME 370-148J

DOS-VSE/RJE/CICS/VOLLIE
Excellent Availability All Shifts
Remote Processing or "HANDS ON"
For Top Priority Scheduling Call DOUG GREENE at:
(212) 889-3388
ICS
One Park Avenue
New York, N.Y. 10016

TELETYPE REFURBISHMENT
$285 + Parts

30 Day Warranty
CALL
(714) 953-4351
A&J COMPUTER SERVICE

SOFTWARE FOR SALE

The School System
Innovative Software For School Administration

- student scheduling
- mark reporting
- attendance
- transcripts
- report writer
- flexible data base design
- interactive and batch
- OS, DOS for IBM 370,4300
- fully documented and maintained
- over 75 standard output reports

COLUMBIA

Contact:
Robert M. Delf
Vice President, Marketing
Columbia Computing Services, Inc.
9611 S. 212th Street
Kent, Washington 98031
(206) 872-0283

amcor DBMS software
FOR DEC / RSTS SYSTEMS

ICP MILLION DOLLAR AWARD-WINNING
DEC GOLD STAR RATED

ambase™ A complete application development tool and DBMS, increasing the productivity of programming staffs across the country from 50-90%. Includes:

- DATA MANAGEMENT SYSTEM
- INQUIRY LANGUAGE
- REPORT GENERATOR
- SCREEN FORMAT GENERATOR

ALSO AVAILABLE:

- ORDER PROCESSING
- SALES ANALYSIS
- ACCOUNTS PAYABLE
- INVENTORY CONTROL
- ACCOUNTS RECEIVABLE
- GL/FINANCIAL MGMT.
- PAYROLL

amcor computer corp.
1900 PLANTSIDE DRIVE • LOUISVILLE, KY 40299 • 502/491-9920
REGIONAL OFFICES: Atlanta, GA / San Jose, CA

Two distinguished products for PDP-11 users

INTAC™ Interactive Data Base Management

INTAC is a new concept for data storage and retrieval that features an easy-to-use question and answer format, built-in edit rules, multi-key ISAM data access, interactive inquiry, and a unique report generator.

MAPS™ Financial Modeling

MAPS, recognized worldwide for over five years as a leader in financial modeling and reporting, is used to construct budgets, financial forecasts, consolidations and "what if" analyses.

Call us at (415) 856-1100
ross systems incorporated
1900 Embarcadero Road • Suite 208 • Palo Alto, California 94303

VISICALC® USERS

Visicalc users group now being formed. Created to help you make the most of your Visicalc package. For **free** sample of monthly newsletter and more info, send coupon to:

Visicalc Users Group
P. O. Box 1523 • White Plains, New York 10602

NAME: .....
COMPANY: .....
ADDRESS: .....
CITY: ..... STATE: ..... ZIP: .....

VISICALC is a registered trademark of Personal Software

HIGH-QUALITY ACCOUNTING AND FINANCIAL REPORTING SOFTWARE

For Dec (RT-11, RSX-11M) and Prime Mini-Computers

- General Ledger & Financial Reporting
- Payroll
- Professional Time & Billing
- Accounts Payable
- Accounts Receivable

COMPUTING
3550 N. Lexington/St. Paul, MN 55112
call toll free 1-800-328-9574
In MN call collect 612-484-8800

"24 WAYS TO IMPROVE TURNKEY SOFTWARE"

This special new consultant's report covers:

- What is this "thing" called "software"?
- Why is software harder to describe and sell than hardware?
- How to avoid the "classic" pitfalls of turnkey systems management
- Two "standards" that will improve your software development and marketing

To immediately receive your copy of this valuable 5,000 word report **plus** illustrated brochure on related publications, mail copy of this ad, your business card, and $3.00 for postage and handling to:

Augur Data Planning Inc.
1401 W. Broadway,
Vancouver, B.C., V6H 1H6

CW/Cel.

software for sale | software for sale | software for sale

DATAPOINT USERS

Country Club Membership and Billing System in Full Databus is now available with the following features:

- Member Master Maintenance
- User Generated Code Master
- Menu Master Maintenance
- Alphabetic Name Scan
- Multiple Label Printing
- Charges Entry & Editing
- Cash Receipts Entry
- Finance Charge Generation
- Member Dues Generation
- Statement Printing
- Aged Trial Balance
- Open Item Display
- Monthly Charges Analysis
- Monthly Cash Analysis
- Monthly Menu Analysis
- Monthly Recap Analysis

Also available are the following:

- Golf Handicapping
- Court Time Scheduling
- P/R, G/L, O/P, A/R, A/P

For more information call or write today:

216-283-2000

MSG MINI-COMPUTER SUPPORT GROUP, INC.
Representing
DATAPOINT CORPORATION
"The leader in dispersed data processing"

3645 WARRENSVILLE CENTER ROAD, SHAKER HEIGHTS, OHIO 44122

ELEGANT SOFTWARE
For RPG Systems

- Order Processing
- Inventory Management
- General Ledger (inc. budgets and statements)
- Accounts Payable
- Accounts Receivable
- Mailing Lists

Designed specifically for IBM System/34

All systems are:

- Heavily interactive
- Multi-company/location
- Humanly engineered
- Well documented

J.D. Edwards & COMPANY

Architects and Builders of Information Systems

Two Denver Technological Center
Englewood, Colorado 80111
(303)773-3732

RSTS/E ON VAX
ROSS/V (RSTS/E Operating System Simulator for VAX)

ROSS/V is a software package, written in VAX-11 MACRO, which provides a RSTS/E monitor environment for programs running in PDP-11 compatibility mode on DEC's VAX-11.

ROSS/V SUPPORTS:

- The BASIC-PLUS interactive environment.
- Concurrent use of multiple run-time systems.
- Update mode (multi-user read/write access to shared files.)
- CCL (Concise Command Language) commands.
- An extensive subset of RSTS/E monitor calls.

ROSS/V runs under VMS and interfaces to programs and run-time systems at the RSTS/E monitor call level. ROSS/V makes it possible for DEC PDP-11 RSTS/E users to move many of their applications directly to the VAX with little or no modification and to continue program development on the VAX in the uniquely hospitable RSTS/E environment. Most BASIC-PLUS programs will run under an unmodified BASIC-PLUS run-time system.

RSTS, PDP-11, VAX-11, and DEC are trademarks of Digital Equipment Corporation.

ROSS/V IS AVAILABLE FROM:

(EASTERN U.S.)
Evans Griffiths & Hart, Inc.
55 Waltham Street,
Lexington, Mass.
02173
(617)861-0670

(CENTRAL U.S.)
Interactive Information Systems, Inc.
10 Knollcrest Drive,
Cincinnati, Ohio
45237
(513)761-0132 or
(800)543-4613
outside Ohio

(WESTERN U.S.)
OnLine Data Processing, Inc.
N. 637 Hamilton,
Spokane,
Washington
99202
(509)484-3400

NEW FOR SYSTEM/34

GENERATE ON-LINE F/M PROGRAMS – ON-LINE ADD/CHG/DEL/INQ
58 FIELDS, REPORT OUTPUT

S/34 DOCUMENTATION AND ANALYSIS AID SYSTEM

OTHER SYSTEMS FOR S/3 AND S/34 – A/P, G/L, A/R, P/R, OTHER

(EXTENSIVE DOCUMENTATION, RPG II SOURCE PROVIDED)

BANCROFT COMPUTER SYSTEMS, INC. (318) 388-2236
P. O. Box 1533 West Monroe, Louisiana 71291

IRIS USERS (DG & OTHERS) SOFTWARE PACKAGES:

POINT SPOOLING SYSTEM
- Easy to use
- Up to 9 Printers

JOB PROCESSING SYSTEM
- Schedule programs to be run
- Report on machine time used
- Program error handling

REPORT GENERATOR
- Multi-file access
- Sorting
- Up to six level breaks
- Data calculations
- Logic decisions

DATABASE MANAGEMENT SYSTEM
- Can use existing files
- Data Entry System
- Data Inquiry/Edit System

BUSINESS APPLICATIONS
- A/R-A/P-G/L-P/R
- Order Entry-Billing
- P/O-Inventory Control
- Designed for "easy" Modification & customization
- Extensive "Software Tools" for easy installations

For more information contact:
Business Software Products, Inc.
9200 Noble Ave.
Sepulveda, CA 91343
(213) 893-7943

THE TIME SAVERS

RPG to COBOL
or for those PL/1 Shops
RPG to PL/1

Two of the many **successful** translators offered by Dataware provide a smooth and effortless transition from RPG. The translators can handle most any level of RPG (SYS/3, Mod 20, etc.) and achieve an extremely high percentage of automatic conversion (approaching 100%) of the source code.

For more information please call or write today!

The Conversion Software People
Dataware, Inc.
2565 Elmwood Ave., Buffalo, NY 14217 (716) 876-5722 | TELEX 91519

How to count your chickens before they hatch.

All you need is a DEC PDP-11 with RSTS and FINAR — the financial analysis and reporting language.

- Budgets
- Cash flow
- Planning
- Project evaluation
- Forecasts
- Consolidation

FINAR SYSTEMS
132 Nassau St., Suite 212
New York, NY 10038
(212) 222-2784

SYSTEM 34 WORD PROCESSING

Paratext $250

Full Service Text Editor	Memos
Enter, Edit, Store Text	Contracts
Automatic Centering	Documentation
Automatic Justification	Sales Brochures
3 Print Programs	Business Letters
Individual Forms Design	Marketing Campaigns

For documentation, call Jeffrey Papows (617) 546-3413

Para Research, Rockport, MA 01966

DATAMATE COMPANY

Datamate & Genius
Report Generator for
NCR 8200 & 8400
TI 990. DX10
Dealer inquiry invited.
Datamate Company
1419 S. Quincy
Tulsa OK 74120
918 584-4278

- RPG/RPG II to COBOL
- COBOL to COBOL
- FORTRAN to FORTRAN
- NEAT/3 to COBOL
- DIBOL to COBOL

Converting is easy with

DASD

- Proven software
- Experienced personnel
- Nationwide offices

CHECK WITH US TODAY

DASD Corporation
Corporate Services Center
Dept. 130/9045 North Deerwood Dr.
Milwaukee, WI 53223
(414) 355-3405

PAYROLL PERSONNEL
SUPER/PAY
ONLY $960
ANS COBOL
60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase.

Easy to Use 30 Day Trial

Occidental Computer Systems
6466 Valjean Ave.
Van Nuys, CA 91406
(213) 782-3005

DATAPOINT

Business Systems Software

On-line Interactive Business Systems

A/R, A/P, G/L, P/R and Inv.

written in Databus

Source Code and Documentation available

Custom Computing, Inc.
505 Kay St. P.O. Box 1374
Kilgore, Tx 75662 (214) 984-8639

SYSTEM/34 RPG II PROGRAMMERS ATTENTION

Tired of using print layout charts?
Tired of coding printer output specs?

How would you like to sit down at your work station and design your report on the screen, adding, deleting, moving and inserting until the report is the way you want it, then have the system generate the printer output specifications for you?

Introducing
Apogee/34
Automatic Printer Output Generator

CONTACT: Barney Holscher or Paul Leslie
Construction Data Services
1909 37th Avenue Court, Suite 100
Greeley, Colorado 80631
(303) 356-5907

OMNIDATA

INTERACTIVE data management package for DEC (RT-11) and BASIC/4 systems.

BERMAN ASSOCIATES
Suite 14, 101 East Holly Ave.
Sterling, VA 22170
(703) 450-5000

SOFTWARE WANTED

S/34 PAYROLL PERSONNEL SYSTEM

- ON-LINE
- INTERACTIVE
- MULTI COMPANY
- MULTIPLE VOLUNTARY DEDUCTIONS INCLUDING UNION DUES
- INCENTIVE OR BONUS AND MISC. PAY BY CO., DEPT., AND/OR JOB
- VACATION, SICK AND HOLIDAY PAY PROVISIONS
- GOVERNMENT TAX REPORTING INCLUDING EIC PAYMENTS
- TIME CARD DATA ENTRY AND EDIT, TIME CARD PRINT
- PAYROLL CHECK RECONCILIATION
- INCLUDES SOURCE PROGRAMS AND USER MANUAL

Computer Management Associates, Inc.
4th Floor, Bank Towers Bldg.
Scranton, PA. 18503
(717) 343-9889

SERIES/1

Utilities improve productivity
1. EDXREF — lists sorted cross-reference dictionary of data names & labels used in EDL source programs.
2. EDXDMP — lists disk/diskette records in hex or character format.

New versions now available. Many companies have purchased these programs at $95 each. Send for more info.

LEGLER SYSTEMS COMPANY
23 Charles Hill Road
Orinda, CA 94563
(415) 254-1264

DEC, 10,20/PDP-11
Project Scheduling Software
Critical Path Method (CPM)

- Interactive
- Generates 12 Reports
- Graphic Plotting of Network on line printer or terminal (no graphics hardware required)

Technical Economics, Inc.
P.O. Box 7261
Berkeley, CA 94707
415-525-7774

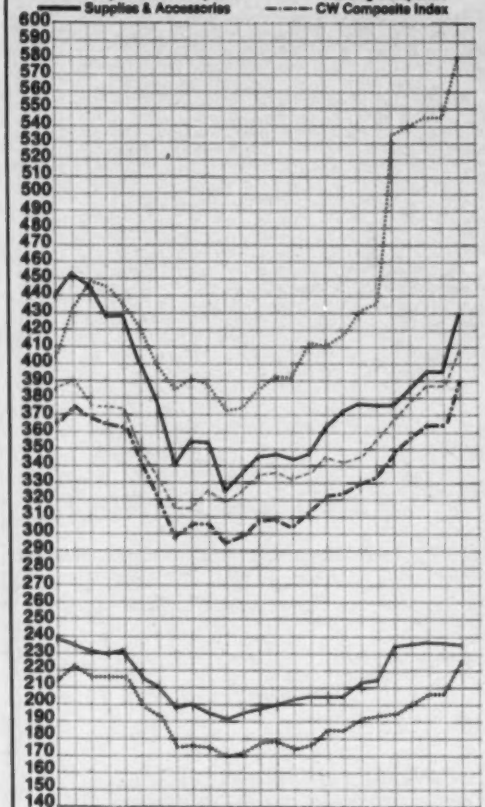
WANTED

ACCOUNTING & APPLICATIONS PACKAGES FOR EVOLUTION/MICRODATA COMPUTERS

For subsequent resale/license to our customers. We are only interested in well documented, installed, proven systems.

Write to:
Floyd Gerstenfeld, Vice-President
COMPUTER PACIFIC CORPORATION
1104 Main Street, Suite 300
Vancouver, WA 98660

Computerworld Stock Trading Index



COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

CW COMMUNICATIONS/INC.
Board Chairman/Publisher
Patrick J. McGovern
President
W. Walter Boyd

VP-Research Jack Edmonston
VP-Marketing Roy Einreinhofer
VP-Editorial E. Drake Lundell, Jr.
VP-Finance William P. Murphy
VP-Circulation Margaret Phelan
VP-Production Lee Vidmer

Computerworld Headquarters
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

SALES
Vice President Roy Einreinhofer
Display Adv Mgr Frank Collins
Display Adv Melinda Walker
Jonna Yager
Jenny Charlesworth
Classified Adv Mgr William J. Mills

RESEARCH
Vice President Jack Edmonston
Market Research Kathryn Dinneen

CIRCULATION
Vice-President Margaret Phelan
Circulation Mgr Barbara Jeannetti
Service Rep Peggy Kelly
Assistant Carmela Priante

PRODUCTION
Vice-President Lee Vidmer
Production Mgr Peter Holm
Supervisor Henry Fling
Typesetting Mgr Tom Pfau

Computerworld Sales Offices

Roy Einreinhofer
Vice-President/Marketing
Frank Collins
Manager, Display Advertising
William J. Mills
Manager, Classified Advertising
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

BOSTON
Robert L. Ziegel
Northern Regional Director
Chris Lee
Edward P. Marecki
District Managers
Kathy Doyle
Susan Worre
Account Coordinators
COMPUTERWORLD
375 Cochituate Road
Framingham, Mass. 01701
Phone: (617) 879-0700
Telex: 95-1153

NEW YORK
Donald E. Fagan
Eastern Regional Director
Peter Senft
Michael J. Masters
District Managers
Candy Kelly
Account Executive
COMPUTERWORLD
Paramus Plaza I
140 Route 17 North
Paramus, N.J. 07652
Phone: (201) 967-1350

CHICAGO
Thomas H. Knorr, Jr.
District Manager
Jane Wrightman
Account Coordinator
COMPUTERWORLD
230 North Michigan Avenue
Chicago, Ill. 60601
(312) 782-7565

LOS ANGELES
Jim Richardson
District Manager
Bob Hubbard
Account Manager
Kathie Knox
Account Coordinator
COMPUTERWORLD
3420 Ocean Park Boulevard
Suite 3020
Santa Monica, Calif. 90405
Phone: (213) 450-7181

SAN FRANCISCO
William J. Healey
Western Regional Director
Barry G. Milione
Bob Stetson
Account Managers
Ruth Gordon
Account Coordinator
COMPUTERWORLD
333 Sacramento Street
Suite 600
San Francisco, Calif. 94111
Phone: (415) 421-7330

JAPAN
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Phone: (03) 445-8101
Telex: J2424461

UNITED KINGDOM
Steve Burton
IDG PUBLISHING LTD.
148 Clerkenwell Road
London EC1
Phone: (01) 837-1222
Telex: UK-269477

Euan C. Ross
BEERE, HOBSON ASSOCIATES
34 Warwickshire Kenilworth
Warwickshire, CV8 1HE
Phone: (0926) 57619
Telex: UK-311951

WEST GERMANY
Eckhard Utpadel
CW PUBLIKATIONEN
Friedrichstrasse 31
8000 Munich 40
Phone: (089) 34-90-61
Telex: W.Ger-5-215250-HKFD

AUSTRALIA
Alan Power
COMPUTERWORLD PTY. LTD.
37-43 Alexander Street
Crows Nest, NSW 2065
Phone: (02) 439-5133
Telex: SECCO AA25468

BRAZIL
Eric Hippeau
COMPUTERWORLD do BRAZIL
Servicos e Publicacoes Ltda.
Rua Alcindo Guanabara
25/10th floor
20031 Rio de Janeiro, RJ
Phone: (021) 240-8225
Telex: 11-32017 (WORD BR)

MEXICO
Kevin Kelleghan
COMPUTERWORLD de MEXICO
Oaxaca 21-2
Colonia Roma
Mexico City 7 D.F.
Phone: (905) 514-4218
(905) 514-6329

TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, JULY 23, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

F X C H		1979-80 RANGE (1)	CLOSE JUL 23 1980	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
A	ANDAHL CORP	15- 42	24 1/2	+2 1/2	+11.3
N	BURROUGHS CORP	68- 88	81 3/8	- 5/8	-0.9
O	COMPUTER AUTOMATION	9- 22	19 1/2	+2	+11.4
N	CONTROL DATA CORP	35- 64	60 1/2	+2 1/4	+3.5
O	CRAY RESEARCH INC	30- 62	60 1/4	- 1/4	-0.4
N	DATA GENERAL CORP	46- 79	76 5/8	+2 3/8	+3.1
N	DATAPOINT CORP	44- 69	66 1/2	+3 1/4	+5.1
N	DIGITAL EQUIPMENT	52- 83	76 7/8	+ 1/8	+0.1
A	EECO INC	9- 19	14 7/8	+1 1/8	+8.1
N	ELECTRONIC ASSOC.	6- 12	9 3/4	+ 7/8	+9.8
N	FOUR-PHASE SYSTEMS	28- 49	26 3/4	+1 1/4	+4.9
N	FORRO9D	31- 49	47 7/8	- 1/8	-0.2
O	GENERAL AUTOMATION	7- 19	6 3/4	- 1/4	-3.5
O	GRI COMPUTER CORP	1- 3	3/8	+ 1/8	+50.0
N	HEWLETT-PACKARD CO	46- 76	72 3/4	+2 1/8	+3.0
N	HONEYWELL INC	95-101	88 7/8	+ 1/8	+0.1
N	IBM	58- 79	64 7/8	+ 5/8	+0.9
N	MANAGEMENT ASSIST	9- 21	14 7/8	0	0.0
O	MANUFACTURING DATA S	22- 38	38	+1 1/2	+4.1
O	MINI-COMPUTER SYST	2- 4	3	+ 1/4	+9.0
O	MODULAR COMPUTER SYS	9- 17	15 3/4	- 1/4	-1.5
N	NCR	42- 62	60 1/2	+ 7/8	+1.2
N	PRIME COMPUTER INC	15- 34	30 7/8	+2 7/8	+10.2
N	PERKIN-ELMER	20- 54	52	+ 1/2	+0.9
N	SPERRY RAND	42- 60	53 3/8	+ 5/8	+1.1
A	SYSTEMS ENG. LABS	11- 22	20 7/8	+ 3/4	+3.7
O	TANDEM COMPUTERS INC	13- 36	30 1/2	+5 1/8	+14.9
N	TEXAS INSTRUMENTS	79-108	99 3/8	+ 7/8	+0.8
A	WANG LABS.	17- 40	36 1/2	- 3/8	-1.9
	LEASING COMPANIES				
O	BOOTHE FINANCIAL CP	13- 29	16 1/4	+ 1/4	+1.5
N	COMDISCO INC	6- 17	13 1/2	- 1/4	-1.8
A	COMMERCE GROUP CORP	1- 2	1 1/8	+ 1/8	+12.5
A	COMPUTER INVSTRS GRP	2- 4	1 3/4	+ 1/4	+7.6
O	CONTINENTAL INFO SYS	2- 15	2 1/4	+ 1/2	+28.5
N	DATAPHIC RENTAL	2- 3	3	0	0.0
A	DCL INC	3- 6	3 1/2	+ 1/8	+3.7
N	DPF INC	9- 12	7 1/2	+ 3/4	+11.1
N	ITEL	1- 15	2 3/4	0	0.0
O	LEASPAC CORP	1- 2	3/4	- 1/8	-14.2
A	PIONEER TEA CORP	2- 4	2 7/8	+ 1/4	+9.5
N	RELIANCE GROUP INC	24- 73	67	-2	-2.8
N	U.S. LEASING	12- 18	17	+1 1/8	+7.0
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 4	3 1/2	- 3/8	-9.6
O	ANACOMP INC	7- 16	14 1/2	+ 1/4	+1.6
O	ANALYSTS INTL COMP	3- 8	4 1/4	0	0.0
A	APPLIED DATA RES.	4- 14	13 1/4	+ 1/4	+1.9
N	AUTOMATIC DATA PROC	31- 45	44 1/8	+1 1/8	+2.6
O	COMPUTER HORIZONS	1- 4	3 3/4	0	0.0
O	COMPUTER NETWORK	4- 9	5 3/4	+ 1/4	+4.5
N	COMPUTER SCIENCES	11- 26	24 3/4	+ 1/2	+2.0
O	COMPUTEX TASK GROUP	1- 9	9 1/2	+ 1/4	+2.7
O	COMPUTER USAGE	2- 5	3 7/8	+ 1/8	+3.3
O	COMPUT AUTO REP SVC	4- 10	8 1/8	0	0.0
O	COMSHARE	11- 29	15 1/4	+ 1/4	+1.6
O	CULLINANE CORP	18- 41	40	+2	+5.2
O	DATA DIMENSIONS INC	1- 6	1 3/4	0	0.0
O	DATAVAR	1- 6	1 1/8	0	0.0
O	DSI CORP	4- 9	5 7/8	- 3/8	-6.0
N	ELECTRONIC DATA SYST	19- 28	27 1/2	+1 1/4	+4.7
O	INFORMATICS INC	9- 22	19 1/2	-1 3/4	-10.1
O	INSYTE CORP	1- 3	2	0	0.0
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5	- 1/2	-9.0
O	KEYDATA CORP	2- 5	2 1/8	+ 3/8	+21.4
A	LOGICON	12- 24	24 1/4	+2 5/8	+12.1
O	MATHEMATICA INC	5- 16	15	0	0.0
O	NATIONAL DATA CORP	10- 21	19 3/4	- 1/2	-2.4
N	PLANNING RESEARCH	5- 9	7	+ 3/8	+5.6
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	4- 7	5 1/8	- 5/8	-10.8
O	REYNOLDS & REYNOLD	24- 34	25	-3	-10.7
O	STSC INC	8- 11	11 1/4	+ 1/2	+4.6
N	SCIENTIFIC COMPUTERS	9- 17	15 1/2	+ 1/4	+1.6
N	TYMSHARE INC	34- 58	58 1/8	+ 1/4	+0.4
A	URS SYSTEMS	9- 15	13 5/8	- 1/4	-1.8
N	WYLY CORP	4- 10	9 1/2	+ 3/4	+8.5
	PERIPHERALS & SUBSYSTEMS				
N	AM INTERNATIONAL	13- 29	16	- 3/4	-4.4
N	AMPEX CORP	14- 29	24 1/2	+1 3/4	+7.6
A	ANDERSON JACOBSON	9- 17	12 3/4	+1 1/8	+9.6
N	APPLIED DIG DATA SYS	5- 12	12	+3 1/4	+37.1
O	AUTO-TROL TECHNOLOGY	18- 48	48	+4	+11.1
O	BEEHIVE INT'L	3- 8	7 7/8	- 3/8	-4.5
A	BOLT,BERANEK & NEW	12- 25	24 1/2	- 1/4	-1.0
N	BUNKER-RAMO	17- 32	29 7/8	+ 3/8	+1.2
O	CAMBRIDGE MEMORIES	1- 4	2	0	0.0
N	CENTRONICS DATA COMP	28- 55	35 1/4	-3 1/8	-8.1
A	CETEC CORP	3- 7	6 1/4	+ 3/4	+13.6
O	COMPUTER DEVICES INC	9- 9	6 5/8	- 1/8	-1.8
O	COGNITRONICS	1- 6	4 1/8	+1 3/8	+25.0
O	COMPUTER COMMUN.	4- 18	5 1/8	+ 3/4	+17.1
O	COMPUTER CONSOLES	4- 29	16 3/4	+1	+6.3
O	COMPUTER TRANSCEIVER	1- 5	3 1/4	+ 5/8	+23.8
N	COMPUTERVISION CORP	24- 73	71	+5 1/2	+8.3
N	CONRAC CORP	13- 25	17 3/8	+1	+6.1
	DATA ACCESS SYSTEMS	6- 14	12 5/8	- 1/4	-1.9
A	DATA PRODUCTS CORP	11- 25	24	+ 1/2	+2.1
O	DATUM INC	2- 4	2 1/4	+ 1/4	+12.5
O	DECISION DATA COMPUT	2- 5	3 5/8	+ 1/8	+3.3
O	DELTA DATA SYSTEMS	1- 3	3/4	+ 1/8	+14.2
N	DOCUMATION INC	7- 27	13 1/4	- 5/8	-4.5
O	DATARAM CORP	6- 37	9 5/8	0	0.0
N	ELECTRONIC M & M	3- 6	5 7/8	+1 1/8	+23.6
O	EVANS & SUTHERLAND	21- 43	39 1/2	-2 1/2	-5.9
O	FABRI-TEK	1- 4	3 1/4	- 1/2	-13.3
O	GENERAL COMPUTER SYS	1- 4	3 7/8	+ 7/8	+29.1
O	GENERAL DATACOMM IND	12- 18	17	+ 1/2	+3.0
O	GENERAL TERMINAL CP	1- 4	1 3/4	- 1/8	-6.6
N	HAZELTINE CORP	12- 39	25 1/2	+1 3/8	+5.6
N	HARRIS CORP	25- 41	40 5/8	+ 3/4	+1.8
O	INFOREX INC	1- 8	1 1/8	+ 1/8	+12.5
O	INFORMATION INTL INC	8- 15	10 1/2	- 1/4	-2.3
O	INTEL CORP	45- 81	78 1/4	+2	+2.6
O	INTERSIL	13- 33	26 1/2	- 5/8	-2.3
A	LUNDY ELECTRONICS	4- 12	7 5/8	- 1/4	-3.1
O	MSI DATA CORP	5- 11	7 1/4	+ 1/8	+1.7
O	MAGNUSON COMP SYSTS	20- 26	25 3/4	+ 1/4	+0.9
N	MEMOREX	10- 34	13 5/8	+ 1/8	+0.9
N	MOHAWK DATA SCI	10- 28	17 5/8	+ 5/8	+3.6
O	OMEX	2- 10	7 1/2	0	0.0
A	PARADYNE CORP	10- 30	34 1/2	+1 1/2	+4.6
A	PENRIL CORP	9- 15	10 1/2	- 7/8	-7.6
O	RANTEK CORP	10- 17	11 3/4	+ 1/4	+2.1
O	RECOGNITION EQUIP	5- 13	8 1/4	+ 5/8	+7.8
O	SCAN DATA	1- 5	1 5/8	+ 1/8	+12.5
N	STORAGE TECHNOLOGY	12- 21	16 7/8	+1 1/8	+7.1
O	SYKES DATATRONICS	14- 29	27	- 1/2	-1.8
O	T MAR INC	14- 21	18 1/2	+2 1/2	+15.6
A	TEC INC	3- 9	5	0	0.0
N	TEKTRONIX INC	42- 64	59 7/8	+ 5/8	+1.0
N	TELEX	3- 6	3 7/8	+ 1/8	+8.0
O	TESDATA SYSTEMS CP	8- 26	9 5/8	+ 3/8	+4.0
O	TIMEPLEX INC	7- 18	17 5/8	- 3/8	-2.0
O	WILTEK INC	1- 2	2 3/8	+ 5/8	+35.7
	SUPPLIES & ACCESSORIES				
A	AMERICAN BUS FORMS	8- 13	11 3/8	- 1/8	-1.0
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	13- 34	31 1/2	- 1/8	-0.3
O	CYBERNETICS INC	1- 1	7/8	0	0.0
A	DUPLEX PRODUCTS INC	11- 13	12 1/4	+ 1/8	+1.0
N	ENNIS BUS. FORMS	13- 21	17 1/4	+ 1/8	+0.7
N	3M COMPANY	46- 58	56 1/2	+ 3/8	+0.6
O	MOORE CORP LTD	27- 34	33 5/8	+ 1/8	+0.4
N	NASHUA CORP	20- 35	24 1/8	+ 5/8	+2.6
O	STANDARD REGISTER	22- 31	28 1/4	-2	-6.6
A	TAB PRODUCTS CO	14- 23	17 3/8	+ 3/8	+2.2
N	WABASH MAGNETICS	11- 14	13 1/8	- 1/2	-3.6
N	WALLACE BUS FORMS	23- 36	35 1/2	+1 1/8	+3.2

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Two low-cost answers to your printer questions ...from Southern Systems.

Can I afford it?
Economical purchase price is just the start of your savings with SSI's 300 line-per-minute band printer. Easy maintenance and reliability make SSI's B-300 the lowest cost-of-ownership printer in its speed. If you need 300 lpm output, can you afford not to own it?

Is it versatile?
SSI's B-300 is so versatile that it's revolutionary. Character font bands are changed as easily as a typewriter ribbon. Matching the band to the output needs saves you paper, time, money and operator headaches. Loading and adjusting paper and clean cassette ribbons are a snap. The B-300 is quiet and it produces five clear copies. Versatile? Unbelievable!

What kind of maintenance is needed?
Very little...and most of it is handled in-house due to the convenience of the diagnostic display. Field-proven dependable!

Can I afford it?
SSI's 200 lpm impact matrix printer system costs less than ever before. Just compared to the B-300, the M-200 is amazing...it gives you two thirds of the performance at one half the price of the B-300!

Is it versatile?
The M-200 from Southern Systems gives you 128 characters in condensed, expanded or standard print. Up to six clear copies and form-loading from the front, rear or bottom. SSI makes it possible for use with most mini and micro systems, serial or parallel. Definitely versatile.

What kind of maintenance is needed?
Simplicity of design makes the M-200 unbelievably maintenance-free. In fact, no scheduled preventive maintenance is required. The unique print head has a life of 500 million characters plus it's operator-changeable. A diagnostic display eliminates unnecessary service calls.

MORE QUESTIONS FOR THE ANSWERS:

Compatibility?
Southern Systems guarantees it! We design and manufacture our own interfaces so the B-300 and the M-200 as well as all other SSI printer systems will fit your computer...whether it's DEC, HP, DG, SEL, TI or practically any other.

Delivery?
In 30 days or less.

SOUTHERN SYSTEMS, INC.

2841 Cypress Creek Road
Fort Lauderdale, FL 33309
(305) 979-1000; (800) 327-5602
Telex 522135

To SSI Marketing:

Thanks for all these answers. Now give me more. Send information on:

_____M-200
_____B-300 or B-600 (300 or 600 lpm band)
_____The 2550 (1500 lpm Charaband)
_____The 2200 family (300, 600, 900 lpm drum)
_____CT-1200 family (600, 100, 1200 lpm ChainTrain)

My needs are:
___Immediate;___3-6 months;___For information only

My computer is: _____

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone _____